For Time Studies in Machine Operation, See Page 733

NOV 19 1923

COAL AGE

McGraw-Hill Co., Inc., With which is Consolidated "The Colliery Engineer" 20 Cents per Copy

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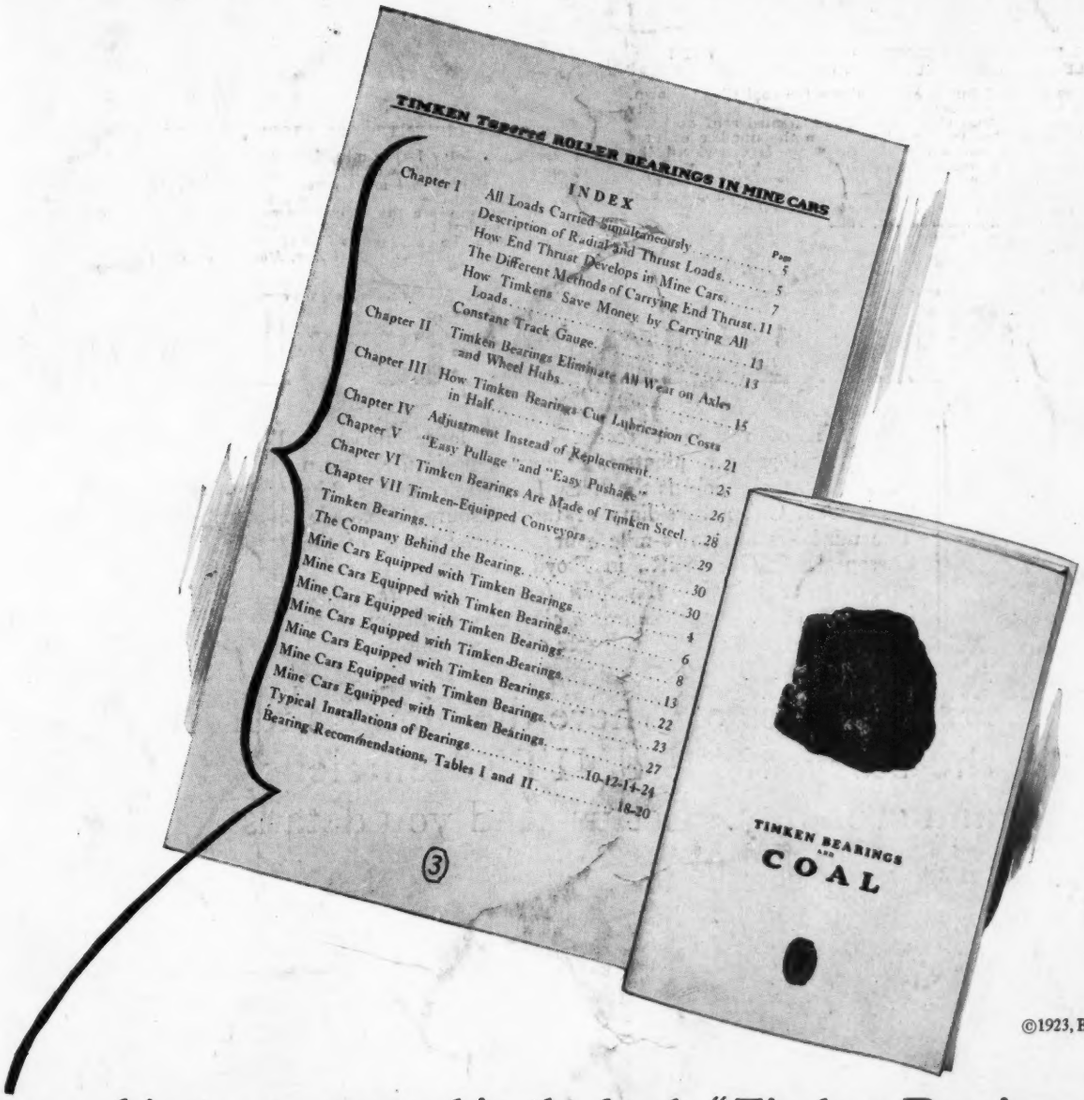
TIMKEN Tapered ROLLER BEARINGS IN MINE CARS
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Chapter I All Loads Carried Simultaneously
Description of Radial and Thrust Loads
How End Thrust Develops in Mine Cars
The Different Methods of Carrying End Thrust
How Timkens Save Money by Carrying All Loads
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Timken Bearings
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Mine Cars Equipped with Timken Bearings
Typical Installations of Bearings
Bearing Recommendations, Tables I and II
TIMKEN BEARINGS AND COAL

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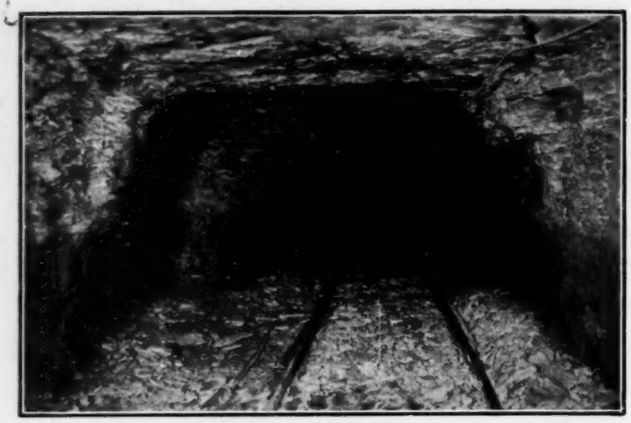

FIG. 9—WELL TRIMMED TWELVE-FOOT ROADWAY WITH HALF-INCH GUNITE COATING ON ROOF

Gunite not only covers the roof but is carried down the coal rib as shown. Of all roofs few are more trying than one filled with coal and especially fossil ferns. This roof is of that character. The cemented roof not only does not fall but keeps up the trolley wire. When the number of fires resulting from fallen trolley and other electric wires is considered the advantage of such guniting becomes the more evident. A little work of this kind may be looked upon as insurance against electric fires. It also reduces the hazard consequent on the use of timber for mine supports and serves to make the illumination of the roadways more effective.
Coal Age, March 1st, 1923

FIG. 10—CEMENT-BLOCK STOPPING WITH GUNITE EDGES

Though the Betsy Layne mine is just starting, it is not handicapped by poor stoppings which will leak and soon rot and have to be replaced by something tighter and more permanent. The weak point in most stoppings is around the edges. Even a cement stopping may fail here. With gunite, not only are the cracks between the stopping and the roof and sides calked but the natural or developed cracks through the roof and the pillars can be entirely shut off if the Gunite is carried far enough.
Coal Age, March 1st, 1923

"GUNITE" in Betsy Layne

ONE of the most recent of the large modernly equipped coal plants to be opened up in the eastern Kentucky field is the Betsy Layne mine of the Pike Floyd Coal Co., a subsidiary of the Pittsburgh Coal Co. The mine lies on a two-mile spur from the tracks of the Chesapeake & Ohio R.R., in Floyd County, seven miles northwest of Pikeville, Ky. *In few places in this field is construction of so permanent a character* or the mechanical detail carried to such a degree of refinement.

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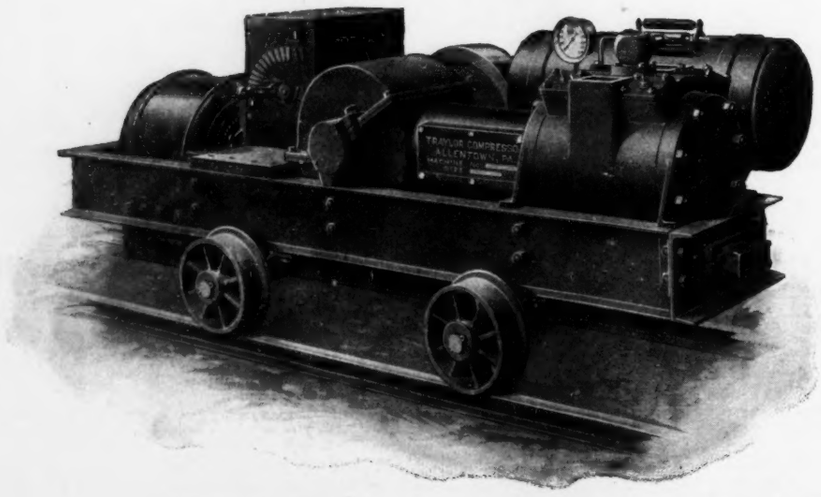

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The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

Volume 24 NEW YORK, NOVEMBER 15, 1923 Number 20

The Anthracite Rate Hearings

WHAT implicit faith the public has in its public agencies! • Here is the Interstate Commerce Commission, acting on the demand of the Coal Commission, making diligent inquiry into freight rates on anthracite The Commerce Commission has gone to the ends of and nary a consumer at hand to protest these rates. the hard-coal consuming earth, Pittsburgh on the west and Vermont on the north, holding hearings and finding it necessary veritably to drag the witnesses in who would say a word on the supposedly livest topic in the East.

But if the affair has dragged so far, the broadening of the scope of the investigation to include rates on bituminous coal, substitutes for domestic sizes of anthracite, as was done last week by the Commerce Commission, will liven things up. If the hard-coal consumers are passive as to the possibilities of the situation, the soft-coal producers are not, and it is certain that an effort will be made to get all-rail rates into New England and New York on such recognized substitutes as smokeless coal that will boom that business.

Central Pennsylvania, also a producer of high-grade low-volatile coal, has, as a whole, neglected in the past the domestic trade on the theory that to seek to compete with anthracite were hopeless. These producers are now given incentive to enter the lists thus opened by the commission. There will also be opportunity for the commission to apply its general theory of favoring short hauls and frowning on the long haul as wasteful of transportation. Smokeless coal, heretofore confined to water haul to New England, is knocking at the door for an all-rail rate that will permit it to enter this rich market for household coal with a product that has not been degraded by many handlings over docks.

No Wage Cuts

IT IS time for some gloomy pessimist to step right out in front and put a great big broad chalk mark on the wall for the non-union coal operators. One after another the strong associations are lining up definitely and firmly on a policy of holding wages to the present level. Hazard took that stand some time ago. The entire Smokeless field has put itself on record against wage reductions. Logan put it to a vote of the men, as it were, and came to the same conclusion. Some of the others are as yet a trifle uncertain. Now is the time to make it unanimous.

The unanswerable argument dictating this policy is that no reduction of wages that could reasonably be made will put the cost down to a point that will sell more coal in the markets of today. Spot-coal prices have descended well below the contract-price levels and even below average cost. Any individual advantage arising from a sharp drop in price is certain to be temporary. The exception is proving the rule, for some local wage reductions are proving embarassing to the operator, who is now looking for an excuse to put them back up.

From a broad standpoint of policy in industrial relations as well as of selling, this action of the non-union operators is well advised. It serves to point out to union men—operators as well as mine workers—that the non-union men are not black, as so often painted. There is a proper time to raise or to lower wages, when you are free to do so. The non-union fields have well judged that this is not such a moment. Conditions are far different now than in the fall of 1921, even though a union wage contract expires the following April.

Furthermore a policy of no wage reductions answers the gloomy critics who have imagined that the sole interest animating the non-union operator is to drive a wedge in between the operators and men in the organized fields, to foment strikes and to profiteer while the union fields are prostrate, whether by reason of strike or because of high and ungovernable costs.

Recapturing the Usufruct

THERE is nothing novel or new in the proposal of the Coal Commission to impose a graded tax on the anthracite producing industry as the one corrective measure to give the hard-coal consuming public "a share in the good fortune of the low-cost, high-profit operator." The excess profits tax of war days was that kind of a measure with the essential difference that it applied to all business alike, and was not assessed against a single industry or class. This plan was suggested by the commission in its summary report of September and repeated in that on investments and profits in the anthracite industry, issued last week.

As a plan it must, first of all, be viewed as a compromise measure. The painstaking and thorough investigation of the commission into this aspect of the hard-coal business disclosed wide variations among producers in the margin between cost of production and the selling price of anthracite. Whereas, in 1921, thirty-nine producers having about seven per cent of the total output lost money, thirty-three per cent of the tonnage was sold with margins ranging from 1c. to 50c. per ton; 52 per cent from 50c. to $1 per ton; and nearly eight per cent between $1.50 and $1.75 per ton. The differences were even more pronounced in the first quarter of 1923, when three-quarters of the total anthracite was sold at margins from 80c. per ton upward to $3 and over. No one would think, however, of that as a feature characteristic of anthracite, for it is inherent in all business.

It is plain enough the commission considered that some of the companies garnered too much profit. See-

ing that 278,000 tons out of more than 18,000,000, or 1.5 per cent, brought the producer and seller $3 or more per ton in the first three months of this year the layman, the general public, will quickly come to the same conclusion. It might have the same opinion of the average margin for all in that three-months' period, namely $1.19 per ton, as compared with 54c. per ton in the year 1921.

It is pointed out in this report that margin is not profit, for against it are to be charged federal taxes and interest on borrowed money before the amount available for the owners of the property is known. Nevertheless the margin is an index of profits, and since the commission was not able to name the profits in terms of percentage on investment, the public must look to the figures of margins as a basis for judgment, tempered of course by individual opinion as to whether the industry is entitled to a return on investment measured by present value of the properties and the unmined coal, as measured by original cost, or by some method that gives a figure between these extremes.

But by whatever process of reasoning, before one comes to the conclusion that some of the anthracite producers are taking too great a profit, as the Coal Commission has judged, and following that with the conclusion that the "low-cost, high-profit" producer must be forced to forgo a portion of his gains, one is forced to accept the philosophy that the production of anthracite is a public utility, charged with public interest in a legal as well as economic sense, before that industry can be singled out for a graded income tax on differential profits.

There are other questions as to the legality of such a scheme. The production of anthracite is an intrastate business, hence how can there be a federal tax on income? There is some doubt also whether the present laws of Pennsylvania would permit a state income tax of the nature proposed. But why compromise? If the production of anthracite is a public utility, with some operators making too much profit, why not go the full distance and give the consumer directly the benefit by price regulation or even nationalization of the mines? The public, as did the Coal Commission, balks at this extreme. Price regulation and federal operation, both promise to increase rather than lower costs and prices.

The Coal Commission notes that a graded tax on income would not lower price, but it did not comment on the possibility that it would raise the average cost to the consumer. There are two price levels for hard coal, the conservative one of the "railroad" companies, representing 70 per cent of the whole, that keeps the average down, and the free market price of the independents that reaches higher levels at times of peak demand. What incentive to the large producers to restrain their prices in such a market as that of this fall, if the public is satisfied to pay the price and take a rebate in general taxes?

There is much more to the commission's report on Investments and Profits in Anthracite Mining than its recommendation for a graded tax, though that is its remedy. The report recommends current publicity of all data on costs, prices and profits, and urges the consumer to turn to substitutes if he would lower the price of anthracite. In its assembly of facts, presentation and summarization this report is well above the average of what the Coal Commission has produced. A very difficult subject has been well handled.

Pinchot's Sixty Cents

GETTING a 10-per cent increase in wages through for the anthracite miners was child's play for Governor Pinchot compared with the task of making good on his boast to force the distribution machinery of the industry to absorb that increase in cost. The Governor's latest drive in this direction has the elements of simplicity in every meaning of the word. In short he called the operators to Harrisburg and asked them to agree among themselves and with him to refuse to sell or ship anthracite to any dealer, or to any wholesaler who would ship to any dealer, who charged the public *more per ton than for the same coal a year ago.*

Aside from the fact that the dealer might righteously resent being made the goat for the whole cost of the Pinchot excursion into labor politics, there is the very practical fact of liability for conspiring on the part of any operators who engaged in such an undertaking. Governor Pinchot promised that his Attorney General would give the operators an opinion that would demonstrate that no law could or would be violated by such an agreement, but his Attorney General has not had time during the past month to write it out. Meanwhile the operators are proceeding on the advice of their own legal counsel.

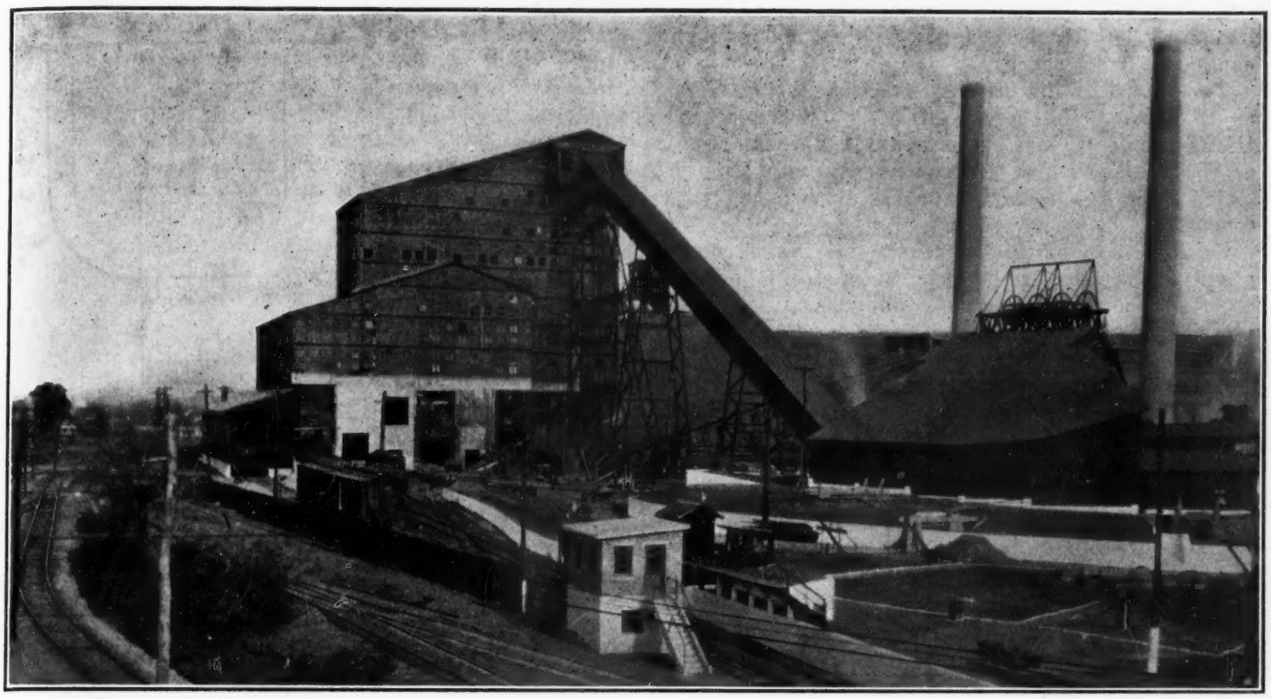
It is hard to believe that Governor Pinchot is really serious in making such a proposal. He may be a practical politician, but he cannot be a practical business man to ask the coal producers to engage in such a doubtful enterprise—to further his political future. The publicity given out passes the buck to the operators, so the Governor may be satisfied.

The Railroads Deliver

THERE may be those who regret the absence this autumn of the usual and normal coal-car shortage and seasonal coal-price flurries. If so they are an insignificant minority. The country is rejoicing in the achievements of the railroads in the year 1923. When early in the year the railroad executives announced that every indication pointed to an unprecedented demand for transportation in the period to follow and that they were going to meet that demand, the popular thought was: Interesting if true.

It was and is true and as pictured to the railroad presidents assembled in New York last week, it was little short of dramatic. The achievements in rehabilitation and in handling traffic the past year have set new records. Emerging from the strike of 1922 and facing a huge demand with an undue proportion of equipment in poor repair and with weakened credit, the railroads have come forth victorious in all save one respect—their earnings are yet below the minimum named by the Interstate Commerce Commission as representing an adequate return.

The railroads are now asking that they be given yet another year in which to demonstrate what private ownership can do. They want the Transportation Act to have a longer life before it is tinkered with. They are asking, in other words, that Congress leave them alone this winter. The railroads have concluded that this Transportation Act that looked so heinous to them three years ago is after all pretty good. Every encouragement should be given the railroads to work out their own destiny under this law, in view of the splendid performance of this year. None can but agree that 1923 promises well for 1924.



No. 14 Colliery, Pennsylvania Coal Co.

Destruction of Anthracite Breakers Proves Need of Fire-Prevention and Fire-Fighting Equipment

Recent Conflagrations Entail Heavy Losses—Use of Steel and Concrete in Construction Materially Reduces Fire Hazard—Prohibit Smoking and Use of Naked Lamps—Description of Spray System in Coal Breaker

By Haydn Hammond
Mechanical Department, Lehigh Valley Coal Co., Wilkes-Barre, Pa.

DUE to a number of large financial losses experienced by several coal companies in the anthracite field within the past year or two, fire protection in anthracite breakers of timber construction is absorbing more thought and study than in the past. The Susquehanna Coal Co. probably suffered greatest, three breakers having burned to the ground within a few months, namely: the William Penn, at Shenandoah, Pa., and Nanticoke Nos. 5 and 7, at Nanticoke, Pa. The Hudson Coal Co. lost the Laflin breaker, at Laflin, Pa., and the George F. Lee Co. lost the Chauncey breaker, at Avondale, Pa. The latter was completely destroyed within three or four hours after the fire was discovered.

These recent heavy losses give conclusive evidence of urgent need for more consideration of the fire hazard and the adoption of efficient fire prevention and fighting methods and apparatus. Coal breakers are an easy prey to flames because of the very nature of their construction as well as because of the fine particles of coal dust that are continually floating in the air, the oil- and grease-soaked timbers and floors.

A prime essential is protection against the possibilities of fire. This involves due consideration of the location, layout, construction, and operation of the breaker as well as the enforcement of certain fire-prevention rules and regulations.

First of all the breaker should be erected far from other buildings that are inherently susceptible to fire or that may even cause fire to be carried in their normal operation. Conversely, it may be said that all other structures should be located sufficiently far from the breaker so as not to set it on fire. Obviously the powder house should be located in some remote place on the property, as is usually the case. However, too little consideration sometimes is given to the location of the boiler house, blacksmith shop, oil house and warehouse.

Electric Plants Should Not Be Near Breaker

Where electric power is used it is foolhardy to mount the outside lightning arresters and switches on or near the breaker structure, as is frequently done. Transformer substations, switching towers and direct-current converting equipment should be located at some distance from the coal breaker. More attention would no doubt be given to the location of this equipment if the designing engineers were to be called upon to operate the apparatus and not only be impressed with the difficulties experienced in keeping the equipment free from dust but also with the fireworks that are set into action on heavy overloads or during lightning storms. Then again, fire practice and fire fighting is always more dangerous and difficult when

Note—Headpiece shows one of the most recent collieries. Many of the older plants, which it does not pay to rebuild, being made of timber and not concrete, glass and steel, need protection such as this article describes.

hampered by treacherous power lines and switching equipment being nearby.

The layout of the breaker structure should be such as to prevent the spread of fire. Steam-locomotive tracks should be laid out only through those sections of the breaker which are concreted or similarly protected from fire from the sparks thrown by the locomotives.

Construction materials such as steel and concrete greatly reduce the fire hazard. Sheet-steel or asbestos-covered rooms should enclose all apparatus which is susceptible to fire but which must be located in the breaker structure. Oil switches and in fact all power switches should preferably be located in fireproof buildings remote from the breaker and controlled by automatic start and stop pushbuttons located at the motors and other convenient locations. All wiring should be enclosed in conduit, motors should be provided with conduit connection boxes and all electrical equipment should be thoroughly painted with a waterproof insulating varnish to prevent, as far as possible, deterioration of the insulation, which may cause flashes from grounds and short-circuits. Steam lines, wherever used, should be covered with pipe covering for the double purpose of preventing heat losses and fire.

Equipment Should Be Tested Frequently

Fire-spray systems, augmented by fire buckets, and fire-alarm systems should be installed and tested frequently. Rules against smoking and the use of naked lamps should be rigidly enforced. Fire-alarm boxes should be marked with red lights and when the breaker is idle all other lights should be extinguished so as to make any fire more easily visible to the watchman while on his rounds. Workmen doing repair work should be provided with extension electric lamps and battery lamps of suitable candle power and capacity to give sufficient illumination for working in the darkest corners. The batteries of these lamps may be readily strapped to the workman's belt and the lamp carried on his cap or in his hand, enabling him to move from one location to another over and around screens, chutes, jigs, etc., without dragging along an extension cord.

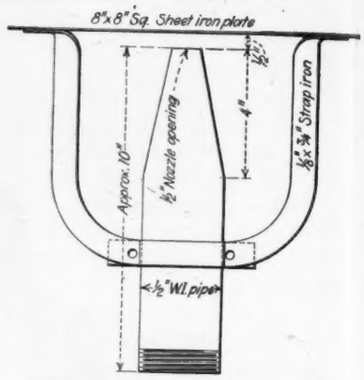


FIG. 2—SPRAY HEAD USED IN PROSPECT BREAKER
Some of these spray heads are installed in an inverted position, depending upon the conditions and direction in which the water is to be thrown.

The fire-spray system installed in the Prospect breaker, located in Wilkes-Barre, Pa., was originally put in service in 1915. A reservoir of 200,000 gallons capacity furnished the fresh water supply under an entrance head to a steam-operated 28x16½x32 duplex pump. The suction pipe was 12 in. in diameter. The pump discharged into a 12-in. cast-iron line connected to a 12-in. main riser pipe in the breaker. At the various floors and platforms and under the roof, laterals were run to approximately seventy spray heads, so located that the entire breaker could be wet down. The amount of water was limited to the safe pump speed, which gave a capacity of approximately 1,600 gallons per minute. On account of some breaker changes it was found necessary recently to add additional laterals and spray heads requiring increased pump capacity up to 2,500 gallons per minute, which the original pump could not deliver at a safe speed. It was therefore decided to replace the duplex pump by an 8-in. single volute centrifugal pump manufactured by Barrett, Haentjens & Co. and driven by a type C. I. Terry steam turbine.

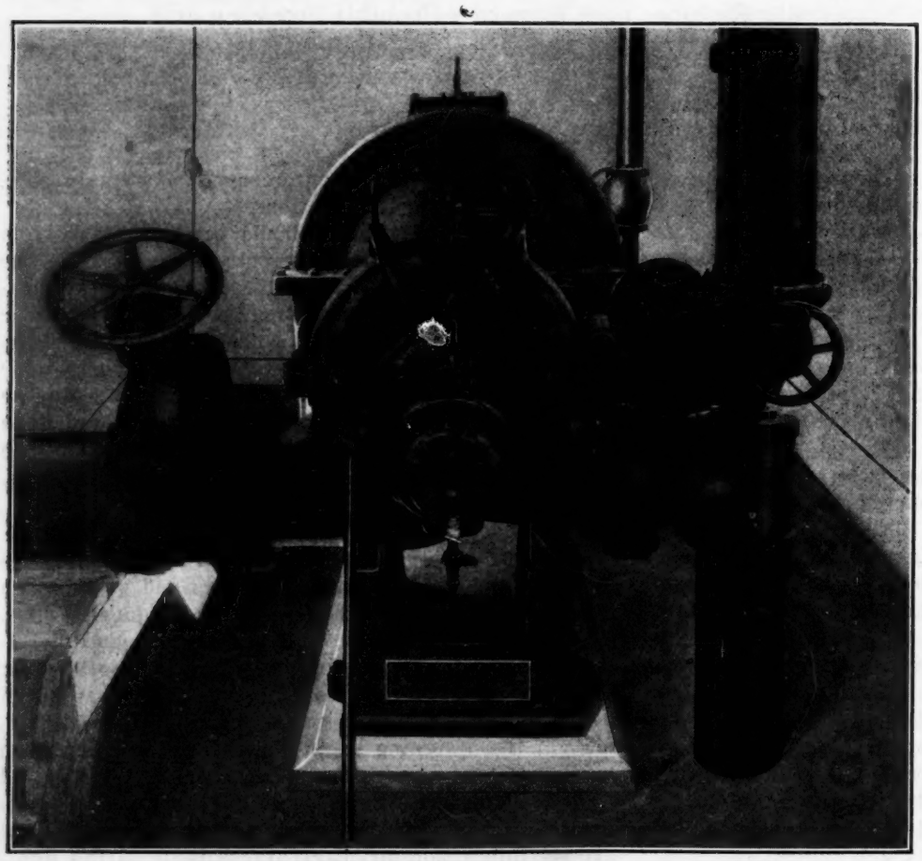


FIG. 1—PUMP AND TURBINE UNIT FOR FIRE SPRAY SYSTEM
The pump has an entrance head of 10 ft. and in 77 seconds can discharge the equivalent of ten fire-hose lines from ninety-eight sprays.

The pump has a capacity of about 2,500 gallons per minute against a total head of 125 ft. at 1,800 r.p.m. The driving unit is equipped with a throttling governor, an emergency governor and water-cooled bearings. The wheel is made from a single forging of special composition steel, and the semi-

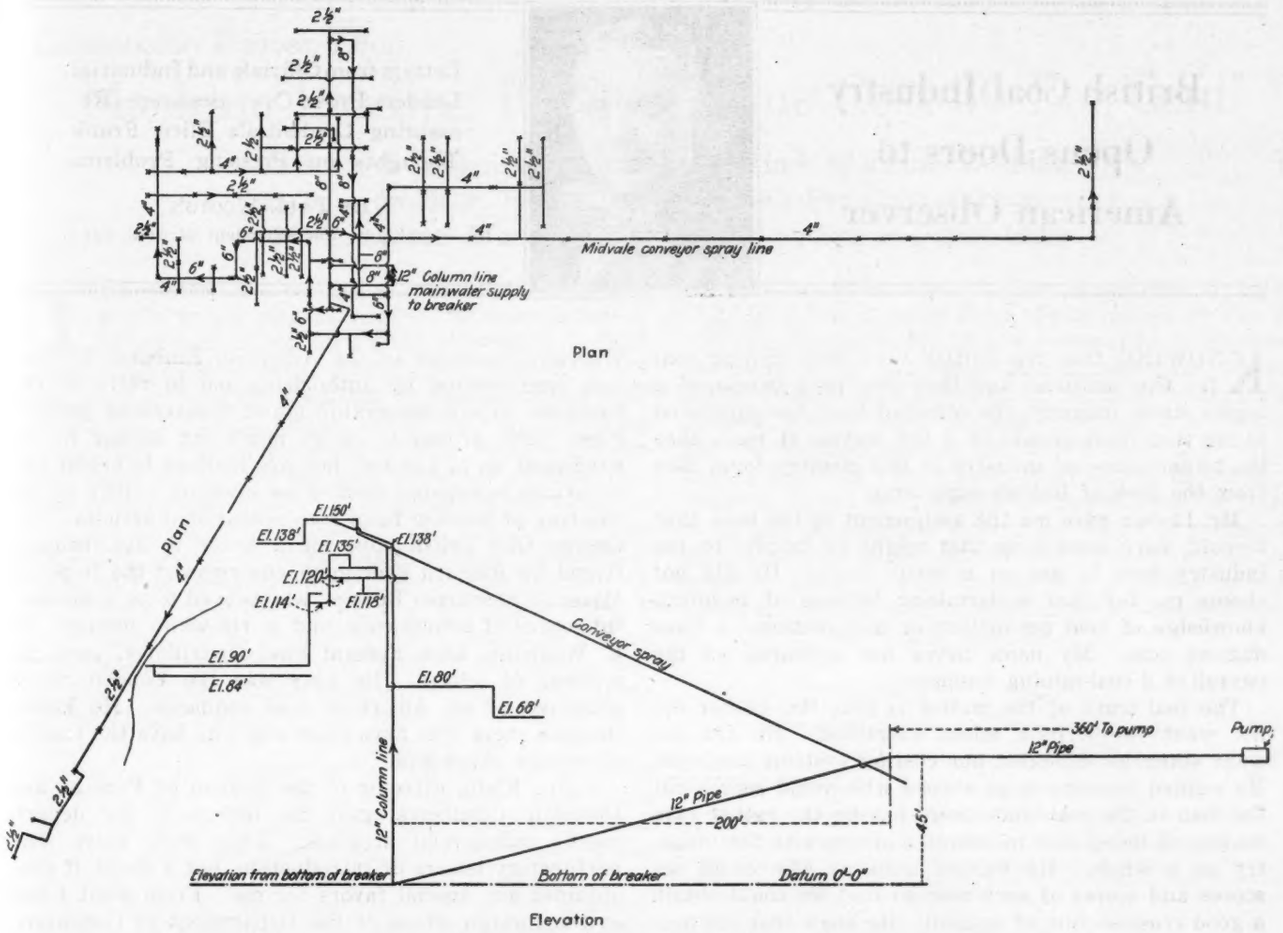


FIG. 3—PIPE LAYOUT SHOWING LOCATION OF FIRE SPRAYS

These views show how the sprays are scattered throughout the breaker and on the conveyor lines. Note that many of the sprays are located in the upper part of the breaker, the open structure inside the breaker readily permits the water discharged at the higher elevations to wet down the lower sections quickly.

circular buckets or pockets are milled from the solid metal. The blades have large clearance and are further protected by the projecting rims at the sides of the wheel, which would take without damage any rubbing that might occur if clearance became reduced. The turbine is of the radial-flow type and is run non-condensing. The steam conditions at the colliery average 110 lb. gage pressure.

The pump is located so as to have a 10-ft. entrance head from the same reservoir through 10-in. suction. pipe and discharges through an 8-in. opening to the old spray system. The 12-in. main is 360 ft. to the foot of the breaker and the riser in the breaker is 138 ft. There are approximately ninety-eight spray heads in the building, of which some are upright, as illustrated, and others the reverse, depending upon the location and conditions for which they serve.

System Equals Ten Lines of Fire Hose

The system will throw a quantity equal to ten lines of fire hose throwing 250 gallons per minute each. The regular standard fire equipment, such as lines of hose, fire pails, water barrels, etc., serve as additional protection.

A bypass on the pump discharge line permits running the pump daily, without flooding the breaker, to assure its being in operating condition at all times. In a recent test from starting until water was discharging through all sprays took 77 seconds. The centrifugal pump was selected in preference to a straight-line duplex pump as it has less moving parts requiring attention and it also eliminates valve and packing troubles.

Steel Displaces Timber in Europe.—Owing to the scarcity of timber, various substitutes are being employed in European countries for mine props, says George S. Rice in his report to the Director of the Bureau of Mines relative to his recent trip to Europe. Steel props and steel arches are being extensively used to uphold mine roofs. In Belgium, mine shafts, in wet, "running," ground, are being largely constructed by the freezing process, in which, through the medium of refrigerated brine forced through pipes surrounding the area to be excavated, the ground is frozen and made easier of excavation. Shafts more than 600 ft. deep have been sunk by this method.

Professor Vladimir Karapetoff, of the School of Electrical Engineering, Cornell University, has been awarded a prize of four thousand francs by the Montefiore Foundation of the University of Liége, Belgium. The award was made for his kinematic computing devices of electrical machinery, described in the technical press during the last three years. A committee of five Belgian and five foreign members, which makes these awards, has characterized this work as an expression of a "new idea which may lead to important developments in the domain of electricity."

British Coal Industry Opens Doors to American Observer

Letters from Officials and Industrial Leaders Prove Open-Sesame—Reassuring Credentials Elicit Frank Thoughts on Pressing Problems

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

KNOWING that the British have been mining coal for five centuries and that they have developed a highly stable industry, the editor of *Coal Age* suggested to me that there should be a few leaves, at least, that the bituminous-coal industry in this country could take from the book of British experience.

Mr. Lesher gave me the assignment in the hope that I could learn something that might be helpful to the industry here to get on a better basis. He did not choose me for that undertaking because of technical knowledge of coal production or distribution. I have dug no coal. My name never has appeared on the payroll of a coal-mining company.

The real truth of the matter is that Mr. Lesher did not want the British mines examined. He did not want statistics compiled nor costing systems analyzed. He wanted someone to go abroad who would search out the men in the coal trade there having the rather rare faculty of being able to survey and appraise the industry as a whole. He wanted someone who could see scores and scores of such men so that we could obtain a good cross-section of opinion. He knew that the men who have spent their lives in the British industry have at their tongues' ends more accurate information about it than could be compiled in a year by twenty American experts making their own first-hand examinations. All that he wanted to do was to send a news gatherer who had some conception of the troubles which afflict the American industry to talk with British coal men and to ascertain how they have met those problems or have prevented them from becoming acute.

I had the advantage of long experience in Washington, where one man is expected to keep an eye on 435 Congressmen and 96 Senators, as well as to keep abreast with the doings of some 300 executive and other establishments and agencies. Such experience tends to develop an ability to flit quickly from flower to flower in the search for news and opinion. Experience in Washington has educational value in that the news gatherer here must learn to separate wheat from chaff in opinion. For these reasons the articles which I expect to write will contain no opinion of my own. I will attempt to reflect as accurately as it is within my power the many interesting things which were told me and shown me by those engaged in the production and distribution of coal from British mines.

I set out with some important assets in the form of letters. One was from the Secretary of State. Then I had a letter from Commerce Secretary Hoover, which I displayed at the slightest excuse, as I found it was particularly effective in paving the way into confidence of those on whom I called. John Hays Hammond, at that time chairman of the Harding Coal Commission, took the risk of giving me a blanket endorsement. In addition he gave me a letter to Post Wheeler, counsellor of the American Embassy in London, who reacted by authorizing me to refer to the Embassy anyone suspecting me of muckraking proclivities. This proved to be an important anchor to the windward, as in London they are inclined to credit any American newspaper man of an uncanny ability in the twisting of prosaic facts into sensational articles. Dr. George Otis Smith gave me a letter to his intimate friend Sir Richard Redmayne, chairman of the Imperial Minerals Resources Bureau, who proved to be a wonderful source of information and worth-while opinion. F. R. Wadleigh, then Federal Fuel Distributor, gave me a sheaf of letters. He once was the London representative of an American coal company. He knows the men there who have ideas and who have the faculty of concise expression.

Julius Klein, director of the Bureau of Foreign and Domestic Commerce, gave me letters to the department's commercial attachés. They were more than perfunctory letters of introduction, but I doubt if they obtained any special favors for me. From what I saw at the foreign offices of the Department of Commerce, the members of their staffs go to any amount of trouble to be helpful to all comers. In addition, I had various letters from several of the American coal companies who have representatives in London or Paris.

BRITISH COAL INDUSTRY WIDELY DISTRIBUTED

These credentials had the effect of opening any door that I could reach. Unfortunately, my time was so limited that I could not make all of the calls I desired. Not only is the production of coal well scattered over England, Scotland and Wales but the men connected with the industry in London are well distributed over the 600 square miles which the city occupies.

Both at Cardiff and at Newcastle I was given the privilege of the floor at the exchanges. This made it possible for me to question a much larger number of men than would have been the case otherwise. I found no tendency among all those with whom I talked to be reticent. My greatest trouble was in keeping them from interviewing me. They were so anxious to learn just how we do things that it was difficult to keep them talking on the things I wanted to learn about. They are more insistent, however, than the average American in satisfying themselves whether or not an interviewer is likely to make constructive use of the information which they furnish. Reassured by my credentials and by my local sponsors, I believe they acquainted me frankly with their real thought on the problems of their industry, but in nearly every instance they would exact the promise that they were not to be quoted.

[*Next week Mr. Wooton will begin the recital of his experiences abroad.*]

Commission Proves That

Machine Loading Reduces Mine Cost 30 Per Cent*

U. S. Coal Commission Investigator Finds Machines Loading 45 Tons an Hour, Even Though Idle 40 Per Cent of Time— He Compares Machine and Hand Loading in Same Mine

THE statement already made that the cost of coal at the mines may be reduced in many cases by 30 per cent is not theory but is based on a thorough analysis involving detailed time studies of the operation of loading machines in several mines with access to the confidential records of the operating companies. The figure is conservative because it takes but small account of the supplementary savings that will accrue from extended development of the machine.

I and my associate industrial and mining engineers expended several days studying loading machines at work in two mines and made time studies of the work in a third. The general plan of operation with the large loaders is as in Fig. 1, which shows in outline the general type of several designs of loading machines. The head of the machine, which in some types is on a truck running on the track and in others on a caterpillar tractor, and in some cases has on the floor line a cutting machine, is run ahead, thus assisting the lower conveyor to collect fine coal and lumps. This conveyor, which consists essentially of a chain with suitable flights running on an inclined trough, is fed in some machines by separate clawlike arms.

The upper or discharge conveyor of the machine running on a vertical plane, with the emptied flights below the full ones, receives the coal from the lower one and discharges it into mine cars. As the pile of coal is taken away, the head is moved sidewise, or forward, into fresh coal, either by the aid of jack posts as mining machines are moved, or else by the mechanism of the loader itself. One man operates the machine and another may be required to assist the haulage motorman in adjusting the discharge conveyor to the car.

Fills a Four-Ton Car in Three Minutes

For the large-capacity loader, which fills a 4-ton car in two or three minutes, the locomotive stays with the car and hauls it out to the empty track as soon as it is filled, whence it is taken in trips of a few cars each, by another locomotive. As soon as the room is cleaned up, the loader, under its own power or hauled by a locomotive, is taken to the next room. The room which is vacated is then ready for the machine cutter. This is followed by the electric drill and shot-firing, and by the cleaning up of any slate that may have fallen. Under good conditions a loader may load the same room twice in a single shift.

A typical day's work of a large and a small loader is shown in Fig. 2. Only the delays due to shifting the machine from one working place to the next are shown by the breaks in the line, the time waiting for cars between individual loads being included in the general line of the curve. Nevertheless the length of these waits is shown in detail for a typical period in Fig. 3.

In our discussion 400 tons is assumed as a conservative output for the large loader, although this is slightly higher than is shown in the table or diagram, because as such work becomes more nearly a routine and the haulage becomes still better adapted to rapid loading less time will be lost. Besides this, in the days observed, delays occurred due to cars leaving the track or to lack of adequate power, for which in operation there should be no excuse. Furthermore, records of the company show average loading for a period of two weeks at a rate as high as selected, with occasional days in which it was greatly exceeded.

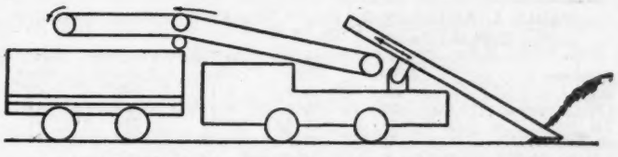


FIG. 1—DIAGRAM ILLUSTRATING LOADING METHOD
By the use of two conveyors the desired flexibility between points of loading and of discharging is attained. Most machines are modifications of this principle.

Reference has been made to large recovery with a large loading machine. The machine works so fast that it is possible quickly to clean up pillars and stumps clear up to the breaking line, giving the roof far less time or opportunity to fall than in hand loading.

A Day's Work of a Loading Machine.—The records of a day's work of a loader in Tables I and II are from actual detailed job analysis covering in each case an entire day of continuous observation with a stop watch. The results of one of these days of a loading cycle for a large and small machine also are shown in graphic form in Figs. 2 and 3, previously described.

All Three Loading Machines Do Equal Work

Studies of the large machine were made by our engineers in two different mines of the same company, one loading machine in the first mine and two loading machines in the second. All these machines were of the same type, one of them, however, having been in operation for five years, at first experimentally and intermittently. Note particularly in the table the uniformity of operation of the three machines. As will appear in subsequent discussions, the operation is normal and representative of regular, continuous daily production.

Examining further the tables for the large machine we note that the time of loading a four-ton car averages 3.2 minutes. Fig. 3 shows a minimum loading time of less than 2 minutes. In one of the mines a number of four-ton cars were loaded in a little over one minute each. Including delays waiting for cars, etc., the total gross loading time per car averages 5.6 minutes. The average tonnage per machine in eight

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hours for the day's observation is 352 tons (of 2,000 lb.), but out of the 480 minutes in eight hours the machine was loading coal 270 minutes, or 56 per cent of the time, and the rest was taken up in changing cars, moving loader, and incidental delays as indicated.

It is evident that with more continuous operation there will be a large increase in the production. If the idle time were reduced to, say, 20 per cent, which is certainly a fair possibility with well-designed transportation, the output would be increased to 550 tons in eight hours.

Instead, therefore, of the 400 tons taken as a conservative average, we may expect a working rate eventually for the large machine of at least 500 tons per eight hours. From the relation of working to waiting time it is evident that attendance upon the loader and the planning of the mine development to meet the needs of the loader, need for maximum production and economy more careful treatment than they are receiving at present. As the loading machine has outdistanced hand shoveling so must control of the operations, the apparatus, and equipment go beyond present methods by which hand loading is planned, controlled and aided mechanically.

TABLE I—ANALYSIS OF DAY'S WORK OF LARGE LOADERS

Loading Rates and Tonnages

Machine	Cars Per 8 Hours	Cars Per Hour	Car Yield Tons	Tons Per 8 Hour	Tons Per Hour
I	86	10.7	4.12	354	44
II	87	10.9	4.12	360	45
III	83	10.4	4.12	344	43
Average	85.3	10.7	4.12	353	44

Total Work and Delays per Loader in Eight Hours, Minutes

Machine	Net Loading Time Min.	Net Time Moving Loader	Net Time Moving Cars	Miscellaneous Delays	Total Idle Time
I	250	51	125	54	230
II	284	71	117	8	196
III	275	74	121	10	205
Average	270	85	121	24	210

Percentages

Machine	Net Loading Time	Net Time Moving Loader	Time Moving Cars	Miscellaneous Delays	Time All Delays
I	52.1	10.6	25.9	11.4	47.9
II	59.1	14.6	24.5	1.7	40.8
III	57.3	15.5	25	2.2	42.7
Average	56.2	13.6	25.1	5.1	43.8

Average Time per Carload, Minutes

Machine	Net Time Loading	Gross Time Loading	Net Time Moving Loader	Time Moving Loader Per Carload	Time Awaiting Cars	Miscellaneous Delay	Total Lost Time
I	2.9	5.6	5.7	0.7	1.4	0.6	2.7
II	3.3	5.5	7.7	0.8	1.3	0.1	2.2
III	3.3	5.8	8.2	0.9	1.5	0.1	2.5
Average	3.2	5.6	7.2	0.8	1.4	0.3	2.5

The time lost in waiting for cars must be reduced by improvements in haulage methods. That lost in moving the loader can be lowered by modifying the manner in which the mine is developed. Nor is that time now lost through miscellaneous delays incapable of being saved, for better standardization and maintenance of equipment will ultimately reduce it.

The data on the small machine given in the Table II are taken from an experimental run of fourteen days conducted by the mining company and from observations made by company officials and representatives of the manufacturers of the loading machine. The important values were checked approximately by our engineers on their visit to the mine. From the observations we selected three of the best days' runs, as it is evident, with machine loaders as with all machinery, that continuous operation smooths out defects and tends to increase the average production to or beyond the maximum in the first experimental runs.

With the small machine the percentage of delays is lower—an average of 35 instead of 44 per cent—but with it more time is lost waiting for cars—an average of 1.9 minutes between loadings instead of 1.4 minutes—showing less efficient haulage in the mine with the small machines. Assuming 20 per cent for delays, the same figure as selected as fair idle time with the large machine, the average capacity of the small unit would become 150 tons in each eight-hour shift.

Introduction of Loading Machine Inevitable

It is evident from the tables and data presented that the loading machine has established such a degree of efficient operation and such a magnitude of tonnage production as to assure its inevitable ultimate adoption in the coal industry. When contributory changes have been made such as will afford rapid transportation of coal to the tipple, speedy handling of cutting and drilling, efficiency in company work and maintenance and such a modification of the system of development as will favor the mechanical loader, the loading machine will introduce a new epoch in the history of coal production.

Haulage for Machine Loader.—In machine loading the haulage problem, as indicated by the percentages of lost time, is even more important than in hand loading. The movement of the coal while the loader is in operation is practically continuous. The movement of the coal in the mine cars is sadly interrupted.

In one of the mines where observations were taken, for example, two locomotives alternately took groups of cars into a room to the loader, replacing the cars as fast as they were filled, remaining with the loading machine until the trip was loaded. The cars were hauled to the main parting in short trips, and in order to avoid the still more expensive idleness of the loader, two other locomotives were employed for this work, these two locomotives spending more than half their total time in waiting.

For example, the average time for the round trip to the parting required 23 minutes, of which 10 minutes was actual running time and 13 minutes waiting. The need here for definite control of transportation, to which reference will be made hereafter, is evident.

TABLE II—ANALYSIS OF DAY'S WORK OF SMALL LOADERS

Loading Rates and Tonnages

Machine	Cars Per 8 Hours	Cars Per Hour	Car Yield Tons	Tons Per 8 Hours	Tons Per Hour
IV	40	5	2.5	100	12
V	50	6.3	2.5	125	16
VI	60	7.5	2.5	150	10
Average	50	6.2	2.5	125	15

Total Work and Delays per Loader in Eight Hours, Minutes

Machine	Net Loading Time Minutes	Net Time Moving Loader	Net Time Moving Cars	Miscellaneous Delays	Total Idle Time
IV	292	74	92	22	188
V	312	47	98	23	168
VI	326	39	84	31	154
Average	310	53	82	25	170

Percentages

Machine	Net Loading Time	Net Time Moving Loader	Time Moving Cars	Miscellaneous Delays	Time All Delays
IV	60.8	15.4	19.2	4.6	39.2
V	65.0	9.8	20.4	4.8	35.0
VI	67.9	8.1	17.5	6.5	32.1
Average	64.6	11.1	19.0	5.3	35.4

Average Time per Carload, Minutes

Machine	Net Time Loading	Gross Time Loading	Net Time Moving Loader	Time Moving Loader Per Carload	Time Awaiting Cars	Miscellaneous Delays	Total Lost Time
IV	7.3	12.0	12.2	1.8	2.3	0.5	2.8
V	6.2	9.6	9.4	0.9	2.0	0.5	2.5
VI	5.4	8.0	4.9	0.7	1.4	0.5	1.9

Machine Cutting and Drilling in Conjunction with Mechanical Loading.—With the development of machine loading, a prime essential is to plan the management of all the operations, including the cutting and drilling, so as to keep pace with the loading. With this in view the arcwall machine, which remains permanently on its truck and which is said to require less labor to operate per ton of cutting than any other cutting machine, has been used. It swings around a semicircle 18 to 21 ft. in diameter, cutting a semicircular kerf in the coal seam. This gives a convenient shape of face for loading. With this plan it has been found possible with one machine and two operators to cut 350 to 400 tons per day.

With machine loading the drilling must be done by a separate gang of men. For this an electric drill was found to be cheaper and quicker than the ordinary hand auger and to be an essential adjunct in preparing coal for the loading machine. A comparison of studies made to ascertain the net times of drilling in various mines indicates that in similar coal the net drilling speed is some five times greater when the electric drill is used instead of the hand auger.

This division of labor also is economical in specializing the work and inducing greater skill, and, therefore, more efficient work. Furthermore, the work can more readily be placed on an incentive basis.

Comparison of Hand- and Machine-Loading Mine.—In order to obtain a true comparison of production and cost of hand vs. machine loading it is necessary to compare conditions where the machine loader is the only variable. Fortunately, for this purpose we were able with the co-operation of the operators and men in the mine to make arrangements for studying machine loading in a mine recently changed over from all hand loading to all machine loading. The physical conditions in the two cases, therefore, were alike and the differences in number of men and in production per man were due simply to the change from hand to machine loading.

The table of comparison of hand and machine loading which follows gives the distribution of the men underground and complete information with reference to the coal loaded and the output per day. Five columns are given in the table. The first column gives the results from a single complete day's observation of the machine; the second column similar data from the records of the company for a six days' performance with three loading machines (this was during a period of two weeks in June, 1923, the mine working intermittently) while columns 3 and 4 give similar information of another mine, column 3 for one day's observation on a single machine and column 4, six days' actual running of the mine with two loading machines.

Number of Men in Mine Almost Halved

Records from the same mine outlined in columns 3 and 4 are shown in column 5 with all hand loaders during the period of two weeks or eight working days in October, 1922. On account of the like conditions a comparison of hand vs. machine loading can be clearly drawn by comparing the various values in columns 4 and 5. It is interesting also to check these machine data with the other mine shown in columns 1 and 2.

It will be seen that the total number of men in the mine in column 5 is cut nearly in two for equivalent production; that is, 118 men underground for 733 tons per day against 73 men underground for a production of 814 tons, the average daily tons per man underground, all men counted, being increased with the machine loader from 6.2 tons to 11.2 tons. Note further that the hand loading in this mine in the previous period was much above the average, or 13.8 tons per hand loader per day.

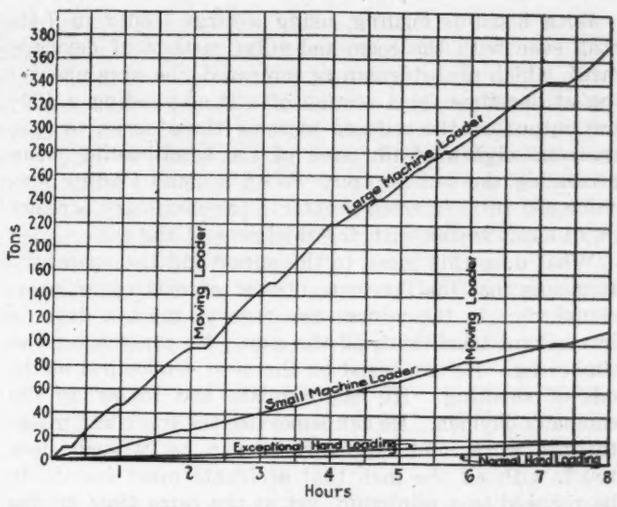


FIG. 2—OPERATION CHART, LARGE AND SMALL LOADER
Horizontal lines in the graph show the time when the machine is being moved from one working place to another, not the time waiting for cars, which latter has been merged into the total time of loading at any given working place. Sloping line shows gross rate of loading, including waiting for cars.

The average output per loader per day in Table III is slightly higher than the average of the tabulation in the previous table, because the men, who were only getting about three days' work a week on account of railroad car shortage, were working a little over eight hours per day.

The use of machines in mines with thick partings which cannot be picked out of the coal fast enough to avoid delaying the machine loader, may necessitate changes in the methods of cleaning. It may be necessary to supersede entirely hand sorting at the face by installing more and better cleaning devices at the tipple. The cost of such extra cleaning, even if appreciably large, will be overbalanced in most mines by the saving in the cost of loading.

A handicap in some sections, which, however, cannot be permanent, is the tendency of the union, on the introduction of any labor-saving device, to seize nearly the whole of the advantage by demanding piece rates high enough to make the cost of the coal practically the same as before. It is inevitable that eventually all savings of this kind, except that portion needed to pay a fair return on the development, must inure chiefly to the consumer.

Advantages of Machine Loading.—The saving in cost of mining by the coal loader is only one of its merits. Its value to the miner himself is of great moment because it eliminates the hardest and most lonesome work in the mine—shoveling coal—and also, because—this is of even greater importance—it increases safety by concentrating and speeding up the work. The latter advantage becomes important as the capacity of the loading machine increases.

Picture the difference in the operation of a hand and a machine loading mine. In the hand-loading mine in 7-ft. coal we get an output of 400 tons from a given section. We have some 30 to 50 hand loaders working in as many rooms in a territory of, say, 25 acres. These men advance in their rooms perhaps for four months until the maximum length of about 300 ft. is reached.

With machine loading, using a large loader in 7-ft. coal, even with the room-and-pillar method of development, which probably can be improved, the area operating at one time for a section of a mine yielding a 400-ton output can be reduced to some three acres, or less than one-eighth of the area of the hand-loading mine producing the same output. With a small loading machine the ratio is much greater. The necessary acreage in all cases varies with the thickness of the coal.

What does this mean to the miner and the operator? It means that the foreman, instead of making an occasional visit to the miner—say once or twice a day—is in constant touch with all the men. He can inspect the timbering. He can insist on the most economical methods of shooting. He can regulate and follow up the company daymen. He can supervise the track and maintenance work, and especially he can be in such close touch with all the men that accidents must inevitably be reduced to a minimum, yet at the same time all the work progresses more rapidly and at less cost. Further than this, because the room is excavated in, say, one month or maybe a half, instead of four months, and pillars can be recovered with similar rapidity, the danger of falls is lessened to a remarkable degree and timbering may be reduced in quantity and less coal be wasted.

Of paramount importance from the standpoint of observation is this larger recovery. It is estimated by operators using the large loading machines that the introduction of these labor-saving devices has increased the recovery by as much as 5 to 10 per cent.

Development Plans With Machine Loader.—Though our observations show conclusively that room-and-pillar methods can be used with machine loading, it is evident from the facts just given that some other system which will reduce the time lost in changing cars and moving the loader will be of further and correspondingly larger benefit. In mines already in operation, the plan of development is difficult to change, but for new workings, operators most interested in mechanical loading have considered modifications of the longwall system.

In one of the modified longwall systems the use of belt conveyors has been considered, in another a steel portable conveyor has been successfully used, and even with the room-and-pillar method there is a possibility of developments of this kind.

Work of Company Men with Machine Loader.—With the use of a machine loader many duties which now fall to the hand loader pass over to company men. Such work as timbering, laying track in rooms, cleaning up after the loader and removing rock or slate are necessarily done entirely by men who can be specially trained for this work. Furthermore, these men work in a small area and under constant supervision of foremen, which is impracticable where individuals are scattered in work places widely apart. Consequently they can be more effectively employed and at correspondingly lower unit costs.

The last three columns of Table III, which give the actual number of inside men employed in a mine operating entirely with machine loaders and the same mine before any loaders were introduced, show the distribution of the gang—except the loaders and men on machine shooting—to be substantially alike in the two cases, notwithstanding that all the timbering and trackwork in the machine mine is being done by company men. Longer operations (the loading machines have been working only about six months in this mine) and further standardization, which is possible with men under such definite control, is bound to effect still greater reduction in the working force.

TABLE III—COMPARISON OF HAND AND MACHINE LOADING

Column Number	(1)	(2)	(3)	(4)	(5)
Mine	I	I	II	II	II
	Machine	Machine	Machine	Machine	Men
Number of days' run	1	6	1	6	8
Miners mining by the car	..	..	4	4	53
Miners mining by the day	2	2	..	..	..
Loading machines	3	3	2	2	..
Loading-machine men	12	12	8	8	..
Machine runners	3	3	3	2	2
Shooting after machine	8	8	8	8	..
Trappers	2	2	1	1	2
Motormen	11	11	6	6	6
Brakemen	11	11	6	6	6
Phone boys	..	..	2	2	..
Wiremen	3	3	1	..	1
Motor repairmen	2	2	..	1	2
Timbermen	6	6	7	7	8
Trackmen	10	10	13	12	20
Slatemen	20	20	10	10	10
Ditching	..	..	..	..	1
Bratticemen	4	4	1	1	2
Sprinklers	2	2	2	2	2
Foremen	5	5	2	3	3
Number of days	1	6	1	6	8
Total men underground	101	101	73	73	118
Man days	101	606	73	438	944
Total cars loaded	298	1,704	200	1,186	1,428.5
Average car yield	4.12	4.12	4.12	4.12	4.11
Total tons loaded	1,228	7,020	824	4,886	5,868
Total tons per day	1,228	1,170	824	814	733
Tons per man loader per day	..	..	..	..	13.8
Tons per machine per day	400	380	385	380	..
Tons per man per day	12.1	11.6	11.3	11.2	6.2

Machine-Loader Mine 40 Per Cent More Efficient

Mining Costs Reduced with Large Machines.—At the beginning of the report the statement is made that in many cases the total cost of coal at the mine, that is, f.o.b. railroad cars, may be reduced as much as 30 per cent. This statement is based on careful estimates covering various physical and operating conditions. The reduction in the number of men underground has already been noted, and, as there indicated, with a longer period of operation this number will be reduced still further because of more systematic supervision and distribution.

Including the outside men so as to include all mining labor (exclusive of camp operation and maintenance) the output per man shift for all the men employed at and in the mine becomes 4.7 tons for the hand-loading mine to 7.7 tons per man for the large machine-loading mine. This is a reduction in total mining labor underground and outside of nearly 40 per cent. Taking into account differences in rates of pay, interest, depreciation and repairs to loading machine, different quantities of supplies, overhead in both cases and indirect labor maintaining mining town, the reduction in cost per ton in the mine under observation is somewhat larger than the 30 per cent presented as our estimate.

Increased Output from the Mine.—The introduction of loading machinery, instead of making so large a reduction in the number of miners, may be utilized in increasing output. Certain operators have estimated from their cost records that by running a mine full time, instead of on half production due to lack of railroad cars, that their reduced overhead and non-productive labor per ton (which items as a total are nearly independent of production) lowered their costs nearly 50c. per ton. Similarly, increase in production with the same overhead and equipment will produce large savings.

In some cases the ultimate increase in production is limited by the capacity of the shaft or tipple, but our observations show that by more uniform operation, by

utilizing the time lost through the day, and by the adoption of the best methods of operation, there usually is a remarkable opportunity to increase production without increasing either the inside or outside equipment. Furthermore, through the reduction in cost due to increased output combined with other savings directly due to loading machines and their accessories, the mine is placed in the class of low-cost production with naturally more uniform operation throughout the year because of readier sales.

Limitation of Loading Machines.—The loading machines thus far developed are limited to coal beds having a thickness of about 48 in. or over. This, however, includes most of the coal mines now being operated. For thinner beds satisfactory machines undoubtedly can be designed when needed although naturally the thinner-bed mines will fall in the class of higher cost, which, unless the coal is of exceptional quality, would operate only on a market with large demand.

Though best adapted to a sound roof, loading machines are being satisfactorily used even where the roof is weak. As a matter of fact—and this is of great importance—the speed of loading of the larger machines is so great that danger of falls is appreciably reduced.

It is not the purpose of this report, however, to consider such details, no matter how important, except to indicate the probable trend of progress in management. We may say, however, that one of the chief dangers of longwall mining with thick seams, that of falls which injure miners or tie up traffic, is minimized with large machine loaders because the speed of excavating makes it more possible to get out of the way before the roof falls.

Loader Has Trailed Behind Other Machines

Present Accomplishments in Mining Machinery and Equipment.—Let us see what has been accomplished in underground machinery up to the present time. Electric locomotives with overhead trolleys are universally used for the haulage of trips on main lines and cross entries. The bottoms and partings and first-aid and office rooms underground, and sometimes (although in fewer cases than might be desired) the workings themselves are lighted by electric lamps. Storage-battery and reel locomotives and electric room hoists are widely superseding the mule for gathering from the working places.

Undercutting of the coal by hand has been largely eliminated by the cutting machine. Drilling is still usually done by hand augers, but in machine-equipped mines the electric drill is coming into use. Ventilation has become a science giving sufficient fresh air in every room and passageway. Drainage is handled by pumps of plunger, piston and centrifugal type—tandem for higher lifts—of the latest design. Outside machinery at tipples and power plants is sometimes highly developed. Watering with a specially designed sprinkler is employed underground in the best equipped mines.

The big possibilities of machinery in coal mining now are in the underground loading and in the adaptation of other underground operations to this method of operation. Experiments have been made with loading machines of various types for some ten or fifteen years. In metal mines their use is quite extensive, but in coal mines they are only just now arriving at a stage where they can be called an operating success.

Machines combining cutting and loading have not yet been proved successful. "A cutting and loading machine however, has just been completed which is designed particularly for longwall operation. The machine advances steadily but slowly into the face of the coal, undercutting it, and the coal so undercut—by the arrangement of the mining method—falls with little or no drilling and blasting on to a conveyor with which the machine is equipped. This conveyor carries the coal to a haulage road where it is loaded into mine cars and so conveyed to the tipple."

A handicap in the development of loading machines has been not merely the overcoming of mechanical and physical difficulties but also the opposition of the Union,

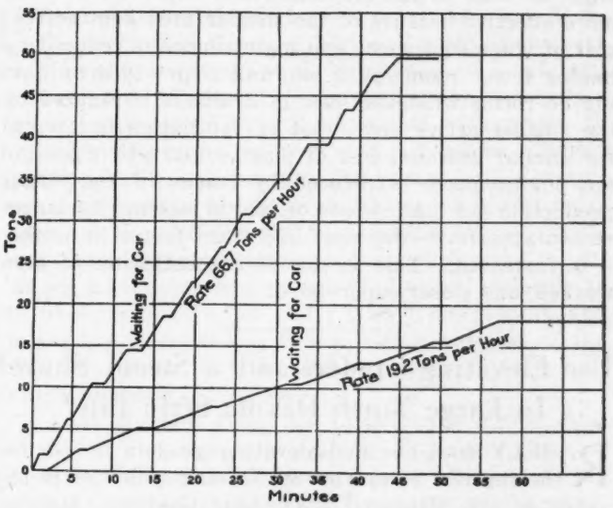


FIG. 3—OPERATION CHART IN SINGLE PLACE
Horizontal lines in this graph show times when loader waits for cars and sloping lines show the net rates of loading.

which has opposed their introduction, or has attempted to attain so high a rate of pay for operating the machine as to deprive them of a large part of their economic value.

Many types of loading machines have been tried. In the West with the softer coal and thick seams electric power shovels of the steam-shovel type have been adopted although regarding these we have no records showing any such large output as we have observed with the type having two conveyors. A modification of this type that is being developed for coal mining in thinner seams is a bucket that is forced into the pile of coal and then lifted backwards and discharged onto a conveyor.

In connection with the loading machines and also in hand loading, experiments are being made at the present time with mine conveyors of various types. For outside operation belt conveyors, often in more than one section, are frequently used for distances of several thousand feet for delivering material for shipment, as for instance, to barges. In one mine visited a belt 400 ft. long carried coal on an incline from the mine to the tipple.

In anthracite mining, belt conveyors have been used at the working place, arranged so that a gang of shovelers distributed along the face shovel onto the belt. For bituminous mines extensive conveyor installations have been proposed and designed. In metal mining, conveyors 6,000 ft. long have been used. Eventually development in loading and transportation may result not only in revolutionary changes from the present "room-and-pillar" method but in the elimination of

the hauling of coal by cars and locomotives and its replacement by some other form of transport with changes also in the methods of cleaning and preparing coal for market.

Summary of Gains from Machine Loading.—Loading is performed at a fraction of the time and cost of hand loading; undercutting can be performed more systematically and efficiently; drilling is done by electric drills; hauling is simplified and trips can be scheduled more definitely and haulage costs reduced; less timber is used; roof falls less readily because of speed of progress and, in longwall work, less working room is required; concentration of workings produces large tonnage in small areas, inspection and supervision being more effective because of the smaller area kept active; cost of track equipment and maintenance is reduced by having fewer rooms or if longwall is provided by having no rooms whatever; cost of drainage is reduced by the smaller active area; cost of ventilation is lowered for similar reasons; cost of plant construction per ton and maintenance is reduced by reason of the larger production per man; waste of coal is lessened by larger recovery; safety—the most important factor in mining—is increased. This is due to concentration of area worked, and closer supervision.

Use Elevating Graders and a Steam Shovel In Large North Dakota Strip Pits*

RARELY does one find elevating graders in use for the removal of overburden in strip pits, but in the valley of the Missouri River, near Garrison, McLean County, at a point almost in the center of the State of North Dakota, Stevens Bros., contractors, of St. Paul, Minn., are using six machines of this type to uncover the lignite over an area of 140 acres.

The deposit is situated one and a half miles south of Garrison, a town of somewhat over 700 inhabitants, on the Soo Line. The property is exceptionally well situated for the method of operation adopted. The coal bed, which is 7 ft. thick, is covered with overburden to a depth of 20 to 30 ft. This consists of 6 to 8 ft. of surface gravel, followed by 3 to 5 ft. of yellow clay, below which is a 1 ft. bed of slack lignite, 3 to 4 ft. of yellow shale, 2 ft. of hard coal and 6 to 10 ft. of blue shale.

The property is cut through by the Garrison Creek Valley, which offers a convenient pit for depositing the overburden. The coal to be mined is an excellent, exceptionally hard, smooth and lustrous lignite, similar to cannel coal in texture and appearance. The method of stripping the three pits is, in general, similar. In No. 1 mine the first "swipe" was taken with a tower drag scraper, and the rest of the cover by the methods followed in No. 2 and No. 3 mines. This is about to be described in reference to the last-mentioned of the three pits.

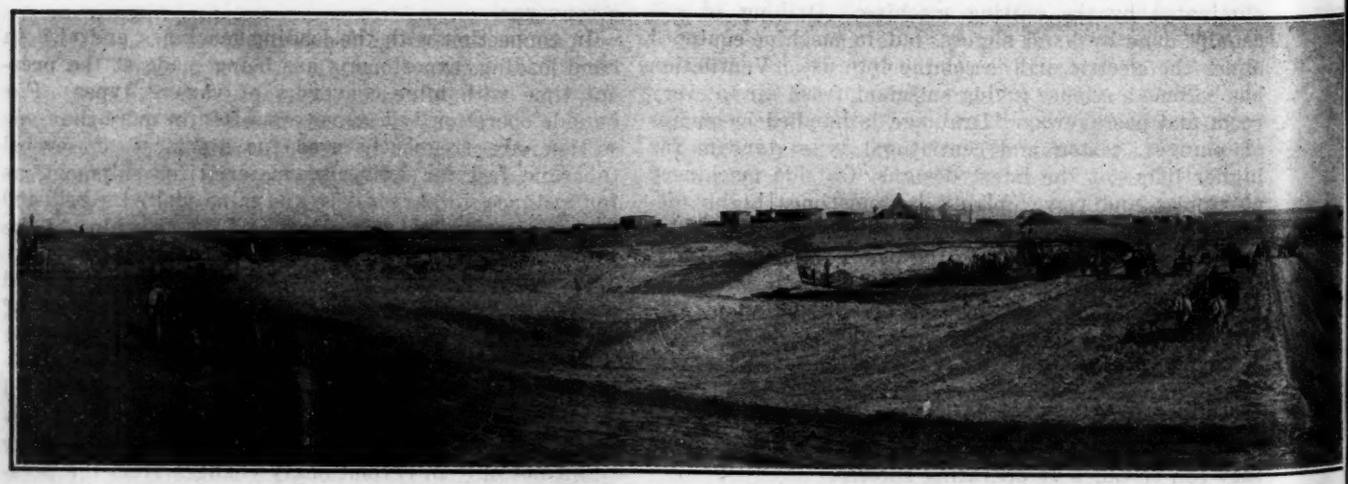
In that mine six elevating graders are used to do the main part of the stripping over the entire surface of the pit, removing, in the course of one series of operations, 1 ft. of overburden. The graders are hauled by six 10-ton tractors and deliver the material which they plow and elevate to from sixty to one-hundred dump wagons, ten or more wagons being allotted to a single grader. The haul averages about 1,000 ft.

The shovel has a 1-yd. dipper and is mounted on caterpillars. It is used for taking the heavy cuts and for removing the sloping banks which are necessarily left by the grader operations. It delivers on an average about 800 cu.yd. per day, loading the material into dump wagons. It also is used for mining the uncovered lignite, although about 50 per cent of this, up to the present, has been mined by hand. Some of the strip material is being dumped back into other parts of the excavated pit.

*Abstract from an article in *The Excavating Engineer*.

ROAD GRADER ADAPTED TO COAL STRIPPING

Two elevating graders which dig and convey surface material to wagons driven alongside make a speedy way of loading up overburden, it being sufficiently soft for such a manner of operation.



STRIP PIT OF STEVENS BROS. AT GARRISON, N. D., OPERATED BY SIX ELEVATING LOADERS AND A SHOVEL.

The coal is taken to the tipple, a distance of about 1,000 ft. There it passes over shaker screens and is loaded into box cars by a box car loader. The capacity of the plant is between 500 and 600 cars per month, the coal being sold in North and South Dakota and Minnesota.

Engineers Society of Western Pennsylvania Discusses Thick Freeport Coal

AGAIN the oft discussed question of the identity and peculiarities of the Thick Freeport coal was the cause of disagreement at the bi-monthly meeting of the Mining Section of the Engineers Society of Western Pennsylvania, held in Pittsburgh, Pa., on Oct. 30, after a paper, "Thick Freeport Coal," had been read by John M. Rayburn, in which he characterized the coal as the "double thick Freeport coal." This terminology was attacked by Dr. Thiessen, of the U. S. Bureau of Mines, who first discounted the redundancy in the combining of the words "double" and "thick," and then declared that the coal dealt with in the paper is none other than the Upper Freeport measure.

Dr. Thiessen said his petrographic studies of thin sections of coals from various seams have proved that the composition and structure of coal from every seam changes gradually from bottom to top. Studies of the Thick Freeport seam, he said, bring to light the same gradation which convinces him that this much-debated measure is only an occurrence of the Upper Freeport bed which attained unusual thickness over limited areas in Allegheny County, Pennsylvania. According to Dr. Thiessen, one would expect to find a halt in the gradual change of composition and structure at the contact between the upper and lower branches of the Thick Freeport seam, if the Upper and Lower Freeport seams really came together. In his studies he has found no such break, nor can the fossils found in the Thick Freeport seam be associated with those of the Lower Freeport seam.

Many speculative thoughts were advanced as to the cause of sandstone wants which are so prevalent in areas where the Freeport coal is thick. Mr. Rayburn believes these were laid down following a quiet period because a shell of talc-like clay separates the rock from the coal. Cross-sections of the wants are unlike those of old stream beds and do not grade in the direction of drainage. Their shapes are irregular and their long axes point in all directions proving that streams were not responsible for the wants.

The Thick Freeport seam has an average thickness of 86 in. and underlies an area of about 73,600 acres. It is estimated that the resources in this seam total 470,000,000 tons. Most of the coal is owned by industrial interests outside of Allegheny County. Coal men in the county failed to appreciate the value of this coal when the field was opened up, and stood aside while people from afar bought up tracts of this coal. It is now being used mainly for byproduct coking.

Prize for Best Battery Locomotive

LIEUTENANT-COLONEL G. R. Lane-Fox, M.P., Secretary for Mines of Great Britain, announces that, in order to encourage the production of a safe and efficient type of electrical storage-battery locomotive for use underground in coal mines and with a view to displacing pit ponies in deep and hot mines, Charles Markham, colliery director, of Ringwood Hall, Chesterfield, has placed at his disposal the sum of £1,000 to be offered as a prize for the best vehicle which fulfills certain specified conditions.

Much discussion has arisen in England relative to the treatment of horses and ponies underground, and the persons interested in legislating animals out of the mines are trying first to find substitutes adapted to British methods of haulage.

J. A. B. Horsley, Electrical Inspector of Mines; Sidney Bates, Institution of Mining Engineers; Roslyn Holiday, Mining Association of Great Britain; Roger Smith, Institution of Electrical Engineers, and Herbert Smith, president of the Miners' Federation of Great Britain, have consented to act as judges and with the co-operation of the Chief Inspector of Mines have drawn up the conditions of the competition.

This will be open to manufacturers of any nationality, Oct. 1, 1923, and will be closed on such date, not less than six calendar months thereafter, as the judges may determine. Working trials in England will subsequently be arranged of any vehicles which are selected for test.

Copies of the conditions of the competition can be obtained on application from A. M. Clegg, Secretary Electrical Storage-Battery Locomotive Competition, Mines Department, Dean Stanley Street, Millbank, Westminster, London, S. W. 1.

LOADERS ARE HAULED BY SIX 10-TON TRACTORS. LIGNITE IN BANK ON RIGHT IS NOT THE SEAM BEING MINED.

New Equipment

Viking Coal-Mine Gathering Pump

A NEW coal-mine pump for gathering purposes now on the market recommends itself by reason of its simplicity, as it has only two moving parts, a large annular gear or rotor and a small internal gear or idler. This pump, known as the Viking, is an application of a design hitherto applied successfully to pumping duties in several industries for handling liquids of high and low viscosity. As is evident from an inspection of Fig. 1, the rotor fits closely inside the casing, through which projects the shaft driven by means of a spur gear and bakelite pinion. The idler revolves upon a hardened ground steel pin on the head of the pump by engaging with the rotor. Aided by the stationary crescent which is integral with the head of the pump, these two gears mesh at a point in the casing midway between the ports to form an absolute barrier. Water sucked in and trapped in the spaces between the teeth of both gears is forced out through the discharge port and there is no churning of the water inside the pump chamber. By reversing the direction of rotation of the gears the suction and discharge ports may be interchanged.

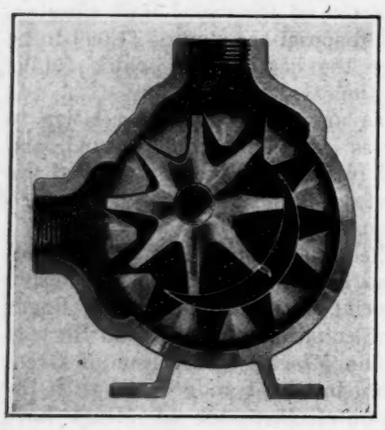


FIG. 1—MINE-PUMP PARTS
Simplicity of construction and ease of repair are very evident. The principle of operation depends upon the trapping of water between the external and internal gear teeth.

Because it has only two moving parts and is provided with a casing-liner which takes the wear instead of the casing, the efficiency of the pump can be easily restored to a maximum by replacing one or more of these parts. Where the water is not acid, the casing and the casing-liner may be made of cast iron, but for general water conditions in coal mines bronze is used.

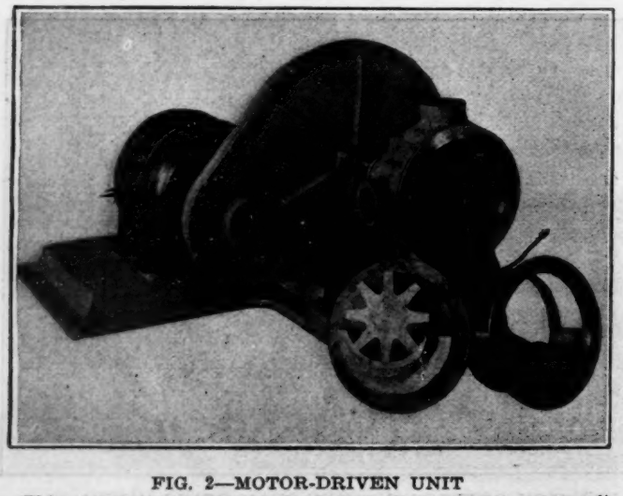


FIG. 2—MOTOR-DRIVEN UNIT
This arrangement gives a simple, compact pumping outfit suitable for easy transportation about the mines.

The characteristics of this pump are unlike those of a centrifugal pump; high efficiency is maintained under varying heads. In actual test conducted at the University of Iowa a 2-in. Viking pump at 440 r.p.m. discharged 101 gallons of water per minute against heads varying from 0 to 150 ft. at an average efficiency of 63 per cent.

The Viking pump will pump water and air, though the efficiency, of course, will be diminished depending upon the amount of air taken in with the water. For this reason it requires no attendance aside from that necessitated for starting or stopping, and for periodic replenishment of lubricating oil in the reservoir. Owing to the fact that the pump will pump water and air it needs no priming, which means that it will pick up again though it has lost its water.

The Viking pump is manufactured by the Viking Pump Co., of Cedar Falls, Iowa, which has placed the sole sale rights with Charles A. Saints, of the Power Equipment Co., Oliver Building, Pittsburgh, Pa.

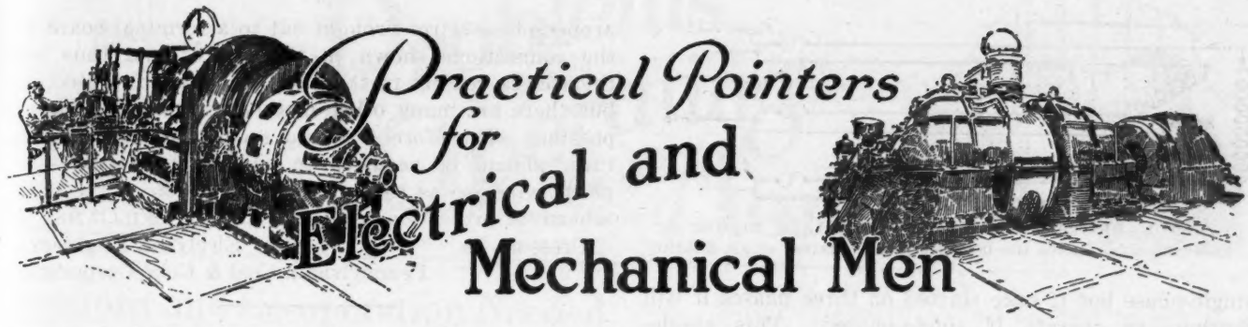
Multiple-Contact Auxiliary Relays for A.-C. and D.-C. Service

AUXILIARY relays for use where it is desired to trip several circuit breakers from one protective relay are manufactured by the Westinghouse Electric & Manufacturing Co. The relays are made in two types, type M for intermittent duty on d.-c. circuits, and type MC for continuous duty on both a.-c. and d.-c. circuits. These relays can be used, for instance, in the differential protection of a generator for tripping at one time the circuit breakers connecting the generator to two busbars and at the same time for opening the field switch. One of the contacts also can be used for energizing a bell alarm circuit. Each contact will make and break 10 amp.

TYPE M RELAY, COVER REMOVED
Automatic control of tripping circuits is protection of a high degree, as it reduces delays and maintenance costs.

The type M relay is provided with a direct-current electro-magnet suitable for various voltages and is furnished with either four or six contacts. Each contact is mounted on an individual phosphor bronze spring. The internal connections are so arranged that the current for the contacts comes in through one lead to a conducting bar on which all the contact springs are mounted. The four or six contacts are all insulated from each other.

The type MC relay is provided with an electro-magnet suitable for continuous duty on either a.-c. or d.-c. circuits of various voltages and can be furnished with either three or six insulated contacts. When energized the three-contact relay makes two independent circuits and breaks one, and the six-contact relay makes five circuits and breaks one. In the case of the six-contact relay, these circuits are not independent but have a common point. The construction of the contacts is similar to that of those on the type M relay, except that the breaking contacts are silver so as to insure a good contact without an excessive amount of initial tension in the helical spring holding the armature open.

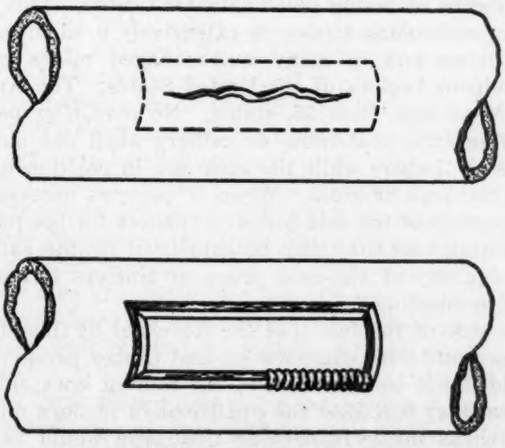


Repairing Ruptured Pipe by Oxyacetylene Welding

A RUPTURED or broken pipe is often the cause of a shutdown and concurrent serious production delays. Hence it is advisable to be prepared for such emergencies by understanding how to handle such a job and having the equipment necessary to its execution at hand when it does happen.

Forces, like so many other things, always follow the lines of least resistance, so that when a break occurs at a certain point in a pipe it usually is feasible to assume that the pipe was weakest at that particular point. In repairing the break by oxyacetylene welding it is well to keep in mind that the metal immediately in the vicinity of the break probably is weak also and for this reason it is best to remove it for a short distance back from the break.

If the break is a longitudinal rupture, as usually is the case, it may be repaired as follows: With an oxyacetylene cutting blowpipe cut away the ruptured and weakened metal, leaving a rectangular hole in the pipe as indicated by the dotted lines in the illustration. Then a rectangular patch of the same thickness and form may be obtained by cutting it from a stock or scrap length of the same size and class of pipe or it may be readily formed from a piece of sheet steel of the same thickness as the pipe wall. If this thickness is $\frac{1}{8}$ in. or more the edges of both the hole and the patch should be beveled to a 45-deg. angle with the cutting blowpipe, so that when the piece is inserted a 90-deg. V-shaped groove will be formed, thus permitting the welder to obtain full penetration of the joint when he butt welds the patch in place. A piece of rod welded to the patch will serve as a handle by which it can be held in place during welding and can be readily cut off with the blowpipe after the welding is completed. This type of repair can be fully completed in an hour or two at very small expense and has the important advantage of being permanent.



WELDING A PATCH ON A PIPE

The upper figure shows the section cut out and the lower figure shows how a patch has been put in position for welding. Chamfered edges permit the weld being made to the full thickness of the metal.

Protecting Transformers and Motors from Damage Resulting from Single-Phasing

EVERYONE using three-phase alternating current has no doubt on some occasion experienced delays, burnouts and various other troubles due to equipment operating or tending to operate on single phase when something has gone wrong with the power supply, wiring of the control apparatus or the equipment itself.

Aside from being troublesome, single-phasing of a three-phase line may result in considerable damage to transformers and motors. Many types of phase-failure devices have been placed on the market, but few if any appear to be entirely reliable and give 100 per cent protection. Perhaps these devices are not perfect in functioning because most of them depend for their operation upon voltage coils which under single-phase conditions have enough induced voltage applied upon them from the single operating phase to prevent them from properly functioning.

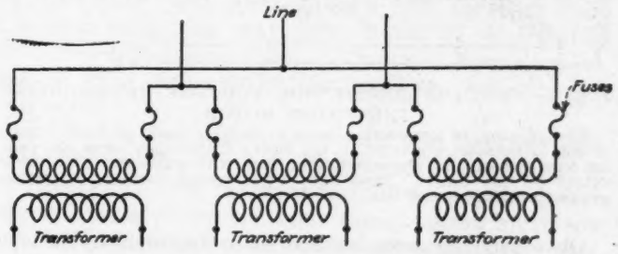


FIG. 1—FUSING A TRANSFORMER BANK

Fuses in the transformer lead wires blow whenever the line wires single-phase.

In the coal industry where many three-phase motors are used to drive fans and pumps, damage to these motors becomes a serious problem. If the fan shuts down for any considerable length of time, serious consequences may result, necessitating the men leaving the mine and the removal of mules. When important pumps shut down the whole pumping station and equipment may be drowned.

Single-phasing of lines feeding transformer banks also is a serious problem because many important motor drives may be connected to a single bank of transformers and single-phasing of the transformer bank immediately places a large amount of equipment in danger of being burned out.

A three-phase induction motor will not start on

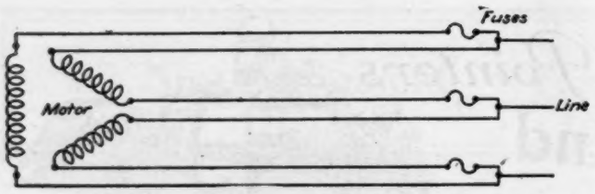


FIG. 2—PROTECTING THE THREE-PHASE MOTOR
This connection gives the best protection against single-phasing.

single-phase but if once started on three phases it will continue to operate if single-phased. This single-phase operation is not always apparent to the operating man and as a consequence one phase winding of the motor carries the total load with greatly increased current and heating until finally it burns out.

For some time our company has been very successful in avoiding damage to equipment by fusing its transformers as shown in Fig. 1. It will be noticed that the fuses are placed in the transformer lead wires, the idea being that these fuses are of much less capacity than those required in fusing the live wires for a given load. The result is that when single-phasing occurs the fuses being placed in the transformer leads and being very nearly the proper current capacity of the transformers they quickly blow out when the additional load resulting from single-phasing comes upon any transformer.

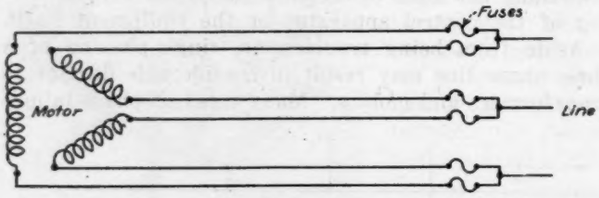


FIG. 3—ANOTHER CONNECTION FOR THE THREE-PHASE INDUCTION MOTOR
The scheme of connection here is not so good as that shown in Fig. 2 because a ground in the motor frame may blow the fuse on one end of the phase winding and still leave the connection intact on the other. Thus the motor would have a circuit to ground and be dangerous.

Obviously the same method of protection may be applied to induction motors, but in order to do this it is necessary to bring out the end wires of each phase. If this is done it is possible to use several different methods of protection by the use of either fuses or relays. Fig. 2 shows how an induction motor might best be protected. Fig. 3 shows another connection for the protection of an induction motor. Fig. 4 shows how this protection may be applied to a motor starter.

Some manufacturers design their induction motors so that they may be connected to operate on two or more different voltages. Such motors may have the proper phase wires brought out to a terminal board for the connections shown in the figures and thus lend themselves readily to the above method of protection; but there are many other motors on which this is not possible. Therefore it would seem that the manufacturer should be required to bring out the necessary phase wires so as to permit the adoption of the above scheme of protection.

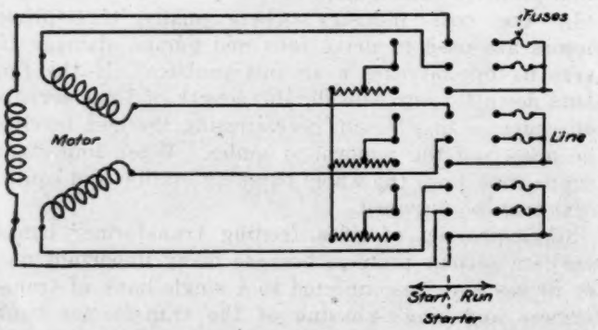


FIG. 4—FUSING AND PROTECTING THE MOTOR AND STARTER
Note that this connection is similar to that in Fig. 2 and that it protects against single-phasing in the motor and starter.

J. F. McWILLIAMS,
Cresson, Pa. Electrical Engineer,
Pennsylvania Coal & Coke Corporation.

Asks Suggestions for Recovering Timber In Anthracite Mines

WHILE making an inspection tour of one colliery of a large coal mining company in the anthracite region I was much impressed by the large amount of timber used, especially in robbing areas where the final recovery of coal is taking place. In many areas in this mine the roof is supported upon a forest of props and cogs which often constitute a menace to the further reclaiming of pillars left for roof support. When the roof is supported upon timbers, no cave takes place, but much of the resulting roof pressure is thrown upon the coal pillars, making the work of pillar mining difficult and oftentimes very dangerous.

I believe that by digging around the butts of the props, much timber could be profitably and safely recovered by means of a prop puller. There also are other cases where with a miner taking back top coal, the props could be economically and safely reclaimed. Let me illustrate. Some of our beds of coal lie on a pitch of about 25 deg. As the chamber advances we take the mining bench, which on an average runs about 7 ft. thick. Above this mining bench we have a parting rock, which is locally known as big slate. This slate oftentimes is found to be about 3 ft. thick, and usually is propped up as the chamber advances.

When the chamber has reached its limit we bring back the remainder of the vein as top coal, blasting down first of all the 3 ft. of big slate. This big slate and débris gather around the props, leaving only about 3 ft. of the upper end of the prop exposed. The top coal left is sound and solid and forms a splendid roof. To recover the props the miner would have to clean about 4 ft. of rock from about the foot of the props. It seems to me that under such conditions a prop puller would be ideal as a means of saving much valuable timber. This practice of reclaiming timber is extensively used in mining in Europe and in many well-managed mines in the bituminous regions of the United States. The Anthracite Mine Law, Rule 55, states, "No person or persons working in a coal mine or colliery shall cut out any props or timbers while the same are in position to support the roof or sides. When it becomes necessary to remove any of the said props or timbers for the purpose of mining coal that may be supported by the same, to dislodge any of the said props or timbers it must be done by blasting."

In view of the fact that the Governor of this state is so keen on forest conservation and timber preservation, would it not be well to have the mining laws amended so that they will meet the conditions of modern mining?

Perhaps many readers of *Coal Age* would be good enough to give us the benefit of their experience along the lines suggested above.

ANTHRACITE MINING ENGINEER.

Problems of Operating Men

Edited by James T. Beard

Harmony and Co-operation Needed Among Mine Officials

Safety-First Type of Men Needed—Strict Discipline Required to Avoid Accidents—Miners Will Follow Foremen They Learn to Trust

SPEAKING of reducing the number of accidents in mines to which so many writers in *Coal Age* have referred and which is of the greatest interest to the coal industry, kindly permit me to offer a few suggestions that I believe are essential to the accomplishment of this purpose. No great aim or purpose can be attained, in any undertaking, without there is team work on the part of every one concerned.

Coal mining, above all other industries, needs men of the safety-first type placed in control of its operations. By this I mean, first, that the superintendent should be a man of good practical experience and judgment. In no way will his ability be manifested more strongly than in the selection of his assistant foremen. Without exception, they should be men who always put safety-first before everything else.

A superintendent should never be satisfied, unless the strictest discipline is maintained in every branch of the work and particularly underground. Prompt obedience to orders should be demanded of every one and violation of the rules should always be punished by a suitable penalty.

Many Safety Rules Soon Become Dead Letters

A penalty attached to a rule commands respect for its observance. Otherwise, many safety rules become dead letters to be followed or disregarded according to the whim of the worker. The result is a laxity of discipline that, sooner or later, will bring accidents.

Where it appears that the superintendent, mine foremen and assistants all work in harmony and have the same desire to make safety the first consideration, one is sure to find good results. The mine will have fewer accidents, because the same spirit pervades throughout the entire organization. Almost without exception coal miners will follow a good example set by a foreman whom they have learned to trust.

One of the most frequent causes of accidents in mines is the attempt to get cheap coal, which generally means a flagrant disregard of safety rules. Too often the mining laws are violated by both foremen and men, who take their own chances in not living up to the requirements of the law. In most cases, our mining laws are good and were enacted to safeguard both lives and property.

When a foreman neglects doing things that he knows require attention and puts aside such work for a few days, in order to keep down the showing on the cost-sheet, he takes chances knowingly and assumes a grave risk. Should he succeed and no accident happen as a result, he will be more careless a second time. This will go on, until he finally meets disaster and an accident will occur that may cost many times the amount he managed to save by his departure from the rules.

It is at such times that a foreman will try to shift the responsibility for his own acts by attempting to fix the blame for the accident on one or more workers, who were simply carrying out his orders. It is my belief that if everybody, from the state mine inspector down to the trapperboy in the mine, would do his duty faithfully, and strive, in every possible way, to make the mine safe there would be fewer accidents and many lives would be saved.

MINER.

Duquoin, Ill.

Dewatering a Wet Hole in Blasting

Water accumulated in a hole drilled for blasting removed by simple device—Its use saves the miner both time and labor.

AMONG the many good things I have found in *Coal Age*, explaining ways and means of overcoming difficulties and saving time and labor, I have seen no mention of a simple device that came to my notice not long since.

In working for a large anthracite coal company and when visiting the various collieries on the property it has frequently been my good fortune to observe different methods of doing the same thing. Some ingenious mind often invents a contrivance that permits the mine worker to perform his duties in a more efficient and safe manner.

On one of my recent trips, I came upon a miner using an ingenious device of his own invention, designed for the purpose of dewatering a wet hole before charging the same for blasting the coal. It was in a place where the coal was being worked toward the outcrop and, naturally, there was much trouble caused by the seepage of water into the hole. Unless this water was removed immediately before charging, the shot would not do effective work and often a misfire would result.

Soap and Oil Fail to Keep Cartridge Dry

Different schemes had been used by the miners to overcome this difficulty. Some would soap their cartridges and others would oil them to prevent the water from coming in contact with the powder. These attempts would often prove fruitless and the cartridge would be drowned in the wet hole before it could be fired. It is unnecessary to say that such a condition entailed extra work and expense for the miner. Holes drilled to the dip, of course, proved the most troublesome.

In the instance I mention, the miner had taken a pipe of a somewhat smaller diameter than that of the hole drilled in the coal. In the end of this pipe, which

was a little longer than the hole, he had arranged a check valve, consisting of a disk of leather reinforced with an iron washer of a little less diameter. By drilling two small holes close to the end of the pipe and inserting a nail, he had succeeded in holding this valve in place so that the pipe formed a hand-pump.

Hole Quickly Charged and Fired

Having drilled and cleaned the hole with his scraper, the miner would soap his cartridge and prepare his tamping in paper bags, or cartridges similar to that holding the powder. He did this to hasten the charging and tamping of the hole after pumping out the water. Then, by working the pipe with the valve in the bottom and plunging it quickly back and forth in the hole, he was able to extract practically all the water that had accumulated therein.

This being done, the charge was quickly inserted, the powder cartridge being followed by the tamping, which was rammed into the hole and the fuse ignited and the shot fired. There are doubtless different ways of fixing the check valve in the end of the pipe so that it will work effectively. One way would be to form a valve seat, by inserting an iron ring in the end of the pipe and placing the leather washer above it, confining its action by the nail inserted through the holes drilled in the pipe.

E. P. Thomas.

Kingston, Pa.

Working Three Contiguous Seams of Coal

Large amount of waste material to be handled makes the economic working of the coal a difficult proposition—Room-and-pillar system of working preferred.

With much interest, I have followed the question of working three seams of coal separated by thick partings of slate and shale, as discussed by writers in recent issues of *Coal Age*. My interest was much increased by reason of the fact that the conditions described correspond very closely to what I encountered some years ago in my own experience.

In that case the rooms were driven up in the lower seam, the 4 ft. of top slate dropped and the 36 in. of coal above it allowed to fall. It was surprising to see the good results obtained. A large quantity of nice coal was mined in this way with scarcely any expense except for loading, which was easily done.

By arranging a chute of common boards placed at the top of the fallen slate and extending into the mine car, we were able to load practically all of the top coal with little effort. The coal was loosened with picks and handled mostly with our hands, scarcely ever requiring the use of a shovel.

In the question under discussion, it is desired to obtain the largest percentage of coal at a minimum cost per ton. Speaking generally, it is my belief that no longwall method of mining can be successfully applied to the working of these three seams as there is too much waste material to be handled. I doubt very much if the coal can be loaded into the mine cars, today, for less than $10 per ton by employing the longwall method.

On the other hand, the three seams mentioned form a good proposition, if care is taken to adopt a suitable method of working out the coal. Like many other undertakings, however, the mistake can be easily made of choosing a wrong method, which will eventually cause much trouble and increase the cost of production. The result is a "gouging system" of mining.

It is my earnest hope that these remarks will not be taken as personally criticizing what has been said. My aim and desire is only that we may come to a better understanding of ways and means of mining coal, and be able to secure a little profit, while paying a living wage to the miner and marketing the coal at a fair price to the consumer.

In line with my own experience and assuming this to be a drift mine, I would suggest developing the property by driving the main headings two, three or four abreast, as desired, in the two lower seams. From these main headings I would drive double-entry butt headings to the right and left, on 400-ft. centers, turning rooms or chambers off these, on 24-ft. centers.

Detailed Plan of Working

Judging from the description given, my plan would be to drive all entries and chambers 12 ft. wide, which would leave 12-ft.-pillars between the chambers. Probably the best plan of mining would be to shoot out the bottom coal a distance of 4 or 5 ft., first, and then shoot down the slate parting and the middle seam of coal. The coal should be loaded out first, after which the slate should be sent out of the mine to the slate dump.

If timbering is found necessary to support the upper parting, I would cut hitches in the coal seam and use short posts to carry the crossbars. It is my opinion, however, that little timbering will be necessary in this case, as the parting is a hard sandy shale varying from 4 to 6 ft. in thickness.

Now, drive four chambers to the limit and cut through the 12-ft. pillars, at that point, taking out the middle seam only and leaving the lower parting and the 12 in. of bottom coal in place. In the same manner, continue to draw back the pillars in these four chambers, say a distance of from 20 to 30 ft. Then, start a fall of the top parting, at the head of the chambers. It may be found necessary to load out a car or two of slate, in order to reach and mine the top seam.

My belief is that this top seam will fall easily and the miner will have the advantage of being able to load the coal of that seam directly into the car. The bottom coal and lower parting left in the pillars will now form a platform, or hogback, from which the top coal can be readily shoveled or handled into the car standing at the side of the pillar.

I would suggest using cars holding at least 3 tons. In case the top sandstone should break, it may be advisable to use plenty of timbers and leave a barrier pillar, between these four chambers and the next set, to control the break. The next four chambers are to be mined in the same manner as the first. In my opinion, this plan will afford a maximum extraction of coal, in these three seams, at a minimum cost of production.

Parnassus, Pa. C. W. Atkins.

Formula for Calculating Limit of Fall in Siphoning Practice

Calling attention to error apparent in development of formula giving limit of fall in a siphon line—Siphon could not operate—Discharge end higher than intake.

Kindly permit me, as one of the interested readers of *Coal Age*, to draw attention to an evident error in the development of the formula for finding the limit of fall h_1 in a siphon line having a given rise or lift h, the lengths of the suction and discharge pipes being l and l_1, respectively, and the diameter of pipe uniform.

The formula expressing the equal effective heads in the two branches of the pipe, as given in *Coal Age*, Oct. 4, p. 521, is correct.

$$\frac{34 - h}{l} = \frac{h_1 - 34}{l_1}$$

Transposed, however, this gives for the limit of fall,

$$h_1 = \frac{l_1(34 - h)}{l} + 34$$

From this last equation it appears the atmospheric head, 34 ft. at sea level, must be added to the other term, instead of being subtracted, as appears on page 521 of that issue. In the application of this formula to the concrete case given on page 522, we find for the limit of fall in a siphon having a lift $h = 24$ ft. and the lengths of the two respective branches of the pipe being $l = 100$ ft. and $l_1 = 500$ ft.

$$h_1 = \frac{500}{100}(34 - 24) + 34 = 84 \text{ ft.}$$

The result found by making the last term minus instead of plus gave the limit of fall as only 16 ft., which would make the discharge at a higher elevation than the supply basin to be drained.

MANAGING DIRECTOR,
Coal Valley, Alta., Canada. Coal Valley Mining Co.

[We are glad to have attention called to this error in the development of the siphon formula on page 521 of the Oct. 4 issue. The limit of fall in the case assumed is 84 ft. as shown by correspondent.—EDITOR.]

Inquiries Of General Interest

Classification of Mine Having Two Openings

Increased Development Calls for Second Opening—New Shaft Operated as Separate Mine—Old Slope Reopened How Legally Classified?

AN ANSWER to the following questions through the columns of *Coal Age* will be greatly appreciated by a subscriber and constant reader:

A certain mine has been developed to a point where it became advisable to sink a shaft. At first, the purpose in view was merely to secure the better ventilation of the extended workings. Later, however, on going carefully over the situation it was decided to equip this opening as a hoisting shaft, as its location favored the shipment of coal on another railroad. The old fan proving inadequate for the ventilation of the entire workings, a new fan was installed at the shaft opening and the old fan shut down for the time. The slope was virtually abandoned, at least as far as hoisting operations were concerned, being used only to haul supplies and refuse in and out of the mine and as a manway for men going to and from their work. An additional shaft has since been sunk and provided with an extra hoist to handle slate and men.

REOPENING THE OLD SLOPE AS A NEW MINE

In the course of time, however, the old slope was again put into operation and coal is now hoisted and dumped over a tipple of its own, the coal being shipped on a different railroad from the one previously mentioned. The new shaft and the old slope are 3½ miles apart. All entries leading from the slope to the shaft have been closed and sealed, except one that has been kept open for use as a manway and supply road. The old fan has again been put in operation to ventilate the workings on the slope side of the mine.

The question I want to ask is, Would this operation be legally classed as a single mine, the two openings being operated under the one management; or would the classification be two separate mines and require two foremen? As much interest has been attracted to the matter in this district, I want to ask for a full explanation stating the reasons for the answer given.

————, Pa. INQUIRER.

In regard to the question of the two operations being considered as one or whether they would be classified as two separate mines, the fact that they are under the same management and control is of no particular consequence. As long as operations underground were confined to the new shaft, and the old slope was merely used for hauling supplies and refuse in and out of the mine, the entire development comprised but a single mine, ventilated by the new fan and hoisting coal at the new shaft. The situation would naturally call for but a single foreman, who would have charge of the entire mine.

On the other hand, when it was decided to reopen the old slope, start the old fan and begin hoisting operations at the slope, the management was virtually starting a second operation, which would naturally be classified as a separate mine. As is well known, the same company will frequently operate a number of mines, either adjoining each other, or in widely separate localities or districts. But each operation is then known and classified as a separate mine.

In the instance cited by the inquirer, the fact that the two openings are ventilated by separate fans, producing two independent circulations, and hoisting and loading coal at separate tipples, would seem to justify the employment of two mine foremen, each having jurisdiction over his own workings and held responsible for the output of coal, the safety of the men and the safe and healthful ventilation of the mine. The fact that there is maintained a manway or opening connecting the two workings would, in most cases, be considered as fulfilling the requirements of the law in regard to second openings, as furnishing a means of escape for the men in case of accident.

Capacity of Pipe to Hold Water

Approximate rule for estimating the capacity of pipes of different diameters—Exact method of calculation explained.

LOOKING through an old textbook a few days ago, I came upon a problem asking for the capacity of a 6-in. pipe, 12 ft. long, to hold water. The solution of the problem, as given in the textbook was based on the statement that a pipe 6 in. in diameter would hold a quart of water in each inch of its length. The rule seemed very simple and I was not long in estimating that for a length of 12 ft. (144 in.), the pipe would

hold 144 qt., or 144 ÷ 4 = 36 gal. This seemed to me a very large quantity of water and I am wondering if the rule was correct. From one of the problems given in *Coal Age*, I attempted to figure the capacity of this pipe, but could not get the same result. As problems of this kind occur frequently in coal mining, I would much appreciate having the calculation explained.

Nokomis, Ill. STUDENT.

The statement of the textbook, as quoted by this inquirer, should read a pint of water to each inch of length of a 6-in. pipe, which would be approximately correct and would make the capacity of a 12-ft. length of pipe, 6 in. in diameter, 144 pt., or 144 ÷ 8 = 18 gal.

To find the exact number of gallons a pipe of any given diameter will hold, multiply the square of the diameter, expressed in inches, by 0.7854. Then multiply this product by the length of the pipe, in inches, and divide the result by 231, the cubic inches in a gallon.

Examination Questions Answered

Anthracite Foremen's Examination Districts 1 and 2, 1923

(Selected Questions)

QUESTION—*What is meant by the terms "mixture" and "explosive mixture"? Explain fully.*

ANSWER—A common mixture is one where two substances of different kinds are mingled intimately in any proportion. In other words, the mixture is simply mechanical, in distinction from a chemical mixture, in which the atoms of the two substances unite in definite proportions and heat is either evolved or absorbed, in the action that takes place. In a mechanical mixture there is no change of heat.

An explosive mixture is one capable of developing an explosion when heat is applied or other means used to produce that result. Methane and air mixed in certain proportions form an explosive mixture known as "firedamp."

QUESTION—*What great mine disaster was responsible for the Act of 1870, increasing safety and protecting the lives and health of those employed in mines?*

ANSWER—The Avondale disaster of Sept. 6, 1869, resulting in the loss of 137 lives, so aroused public opinion regarding the need of adequate mining laws that the Legislature, the following year, enacted what was then known as the "Ventilation Act," which was the embodiment of the present mining law in Pennsylvania.

QUESTION—*What three natural laws govern the flow of air in a mine?*

ANSWER—The three laws that establish the relation between the pressure, velocity, quantity and power of a circulation, are the following: (1) Pressure, in mine ventilation, varies as the square of the velocity of the air current. (2) The power producing a circulation varies as the cube of the velocity of the air current. (3) For a constant power on the air, the quantity of air in circulation varies inversely as the pressure.

QUESTION—*What effect has a regulator on the mine resistance?*

ANSWER—The placing of a regulator in a mine airway has practically the same effect as lengthening the airway. The regulator forms an obstruction to the flow of air, which increases the resistance of that airway. The result is an increased mine resistance and a consequent decrease in the quantity of air circulated by the same power.

QUESTION—*State the conditions in a mine where it is necessary to provide a separate travelingway.*

ANSWER—The anthracite mine law (Art. 4, Sec. 4) requires a separate travelingway to be provided in a slope mine where the inclination is 15 deg. or less. Separate travelingways should also be provided wherever men are compelled to use a main haulage road when going to or from their work.

QUESTION—*How are air measurements made and by whom? How are they to be recorded?*

ANSWER—The anthracite law (Art. 10, Sec. 15) requires the inside foreman, or his assistant, to measure the air with an anemometer or other efficient instrument, at the inlet and outlet airways and at or near the face of each gangway and at the nearest cross-heading to the faces of the inside and the outside chambers or breasts where men are employed. These measurements must be made once every week and entered in the colliery report book.

QUESTION—*How many cubic feet of air are passing in a gangway 10 ft. high on one side, 6 ft. high on the other side and 12 ft. wide at the bottom, the velocity being 300 ft. per min.?*

ANSWER—Taking the average height of the airway as $\frac{1}{2}(10 + 6) = 8$ ft., the sectional area is $8 \times 12 = 96$ sq.ft. Then, assuming an average velocity of 300 ft. per min., the quantity of air in circulation is $300 \times 96 = 28{,}800$ cu.ft. per min.

QUESTION—*What is meant by the term "diffusion of gases"? Explain fully.*

ANSWER—The term relates to that property of air and gases having different densities and in contact with each other, by which their molecules intermingle. The molecules being in a constant state of vibration and the amplitude of vibration depending largely on the density of the gas, the result is a migration of the molecules causing the gases to intermix, which action is termed "diffusion."

QUESTION—*How does the strength of props vary as to their lengths and diameters?*

ANSWER—The strength of a mine prop, aside from the quality and kind of wood, depends on the ratio of the diameter to length of post being such that the timber will present equal resistance to crushing and bending. For average mine timber, this ratio is 1:12. In other words, the diameter of the post, in inches, should be equal to its length in feet. When the length of a post exceeds 12 times its diameter, the post will fail by bending if the load is excessive. Again, when the length is less than 12 times the diameter the post will crush before it will bend. For two posts of the same quality and kind of timber, their relative strength, in respect to bending, varies as the ratio of the fourth power of the diameters to the square of the lengths. Or, the relative strength, in respect to crushing varies as the square of the diameters. It is always a question of whether the post will fail by bending or by crushing, which depends on the length being greater or less than 12 times the diameter.

Coal Commission's Report On Anthracite Profits

Recommends Differential Taxation, Publicity of Accounts and Use of Hard-Coal Substitutes

Marked Variation in Costs Makes It Difficult to Supply Definite Information on Question of Profits—Average Would Be Misleading Because of Extreme Spread—Carrying Charges on Excess Coal-Land Reserves a Burden

Recommending that anthracite operators who have the good fortune to produce coal at a low price and realize a profit above the average should be subject to a special tax; that the federal government should be given power to require complete publicity of accounts, and that consumers of anthracite turn to substitutes for self-protection, the U. S. Coal Commission released on Nov. 10 its report on Investments and Profits in Anthracite Mining.

The Commission says that the man on the street wants a simple answer to the questions, "How much do anthracite operators make?" and adds that it would no doubt satisfy him to be told that the profit is so much per ton and yields the operator such and such a per cent return on his investment. "But such a simple answer cannot be truthfully given, however much it may be demanded by the consumer. It cannot be given because the business of mining anthracite is one of markedly varying cost and because therefore some operators pay very large dividends and others very small dividends, or sometimes no dividends at all."

Averages are misleading under such conditions and there is no single figure that represents either the profit per ton or the per cent return on the investment, and those who wish to find out the profits of anthracite mining must, according to the Commission, be prepared to consider extremes as well as the average and to weigh the evidence derived from one method of valuation against the evidence from another, for the Commission has found no shorter way.

"Some light on profits is thrown by the margin per ton. The margin is the difference between the cost of production and the average sales realization f.o.b. mine on all coal sold. The margin is not the same as profit. From it must first be deducted federal taxes and interest on borrowed money before the amount available for the owners of the business is known. Even then it cannot be translated into terms of per cent return on the investment until the investment per ton is known, and as the investment of different operators varies, so the margin necessary to profitable operation varies from operator to operator.

"The margins of anthracite operators vary within the widest limits. In the year 1921 there were three operators who reported to the Commission a margin in excess of $1.50 a ton. One of these three operators was a railroad coal company and two were small independent producers. Together they mined 7.6 per cent of the total output. But in the same year there were eight other operators who reported to the Commission a *loss* of over $1.50 per ton. These eight operators were all very small producers, and together they contributed but 1 per cent of the total output. They were independents who had high costs and who could not get satisfactory prices under the market conditions of that year.

"In between these extremes were ranged the remainder of the 74 companies reporting, as shown in Table I.

"It is pointed out that the size of margin necessary to profitable operation varies with the investment of the operator. One company may have heavy investments in machinery and equipment and thus show a relatively low labor cost, while another may have a small investment and a high labor cost. In the case of the first company the margin must be larger in order to give an equal rate of remuneration for the larger amount of invested capital per ton of product. Again, there are anthracite-mining properties affiliated with the railroads that are habitually run at a virtual loss in order to furnish traffic to the carrier and there are other companies subsidiary to a larger interest in which the cost of production is burdened with carrying charges on a large reserve of coal lands which is really held for the benefit of the parent company. But with due allowance for these other factors, it is still true that anthracite mining is characteristically a business of differential advantage and widely varying profits."

This fact has an important bearing on any proposal to reduce the cost to the consumer by reducing the profits of the operator. The margins of the high-profit companies, says the Commission, are clearly larger than is necessary to return an adequate income on the average investment, but the effect of any cut in the margin must be gaged not only with respect to the average operator or the high-profit operator but also with respect to the low-profit operator.

Lay Costly Mining Methods to Lack of Competition.—The Commission is aware that the costs of many operators are burdened with carrying charges on coal lands that will not be developed for generations and that the absence of competition in the anthracite region has encouraged the opening

TABLE I—RANGE IN MARGIN PER TON, 1921
Fresh-mined coal, all companies reporting representing 99 per cent of the commercial tonnage)

	Number of Companies	Production (Gross Tons)	Per Cent of Output	Cumulative Per Cent
Companies reporting cost in excess of sales realization	39	4,933,000	7.2	7.2
Companies reporting a margin of:				
$0.01—0.04	2	3,460,000	5.1	12.3
0.05—0.09	1	190,000	0.3	12.6
0.10—0.14	1	67,000	0.1	12.7
0.15—0.19	2	239,000	0.4	13.1
0.20—0.29	6	1,918,000	2.8	15.9
0.30—0.39	2	2,453,000	3.6	19.5
0.40—0.49	5	14,529,000	21.3	40.8
0.50—0.59	4	16,272,000	23.9	64.7
0.60—0.69	1	98,000	0.1	64.8
0.70—0.79	3	6,954,000	10.2	75.0
0.80—0.89	3	11,032,000	16.2	91.2
0.90—0.99	2	839,000	1.2	92.4
1.00—1.24	..	.....	...	92.4
1.25—1.49	..	.....	...	92.4
1.50—1.74	3	5,136,000	7.6	100.0
Total	74	68,120,000	100.0	

TABLE II—RANGE IN MARGIN PER TON, JANUARY TO MARCH, 1923
(Fresh-mined coal, all companies reporting)

	Number of Companies	Production (Gross Tons)	Per Cent of Output	Cumulative Per Cent
Companies reporting cost in excess of sales realization	1	64,000	0.4	0.4
Companies reporting a margin of:				
$0.01—0.04	..	.....	....	0.4
0.05—0.09	..	.....	....	0.4
0.10—0.14	..	.....	....	0.4
0.15—0.19	..	.....	....	0.4
0.20—0.29	3	2,716,000	15.1	15.5
0.30—0.39	..	.....	....	15.5
0.40—0.49	1	29,000	0.2	15.7
0.50—0.59	1	15,000	0.1	15.8
0.60—0.69	2	43,000	0.2	16.0
0.70—0.79	5	1,220,000	6.8	22.8
0.80—0.89	1	263,000	1.5	24.3
0.90—0.99	4	4,228,000	23.4	47.7
1.00—1.24	4	2,012,000	11.2	58.9
1.25—1.49	8	4,141,000	22.8	81.7
1.50—1.74	4	358,000	2.0	83.7
1.75—1.99	8	602,000	3.3	87.0
2.00—2.49	10	1,733,000	9.6	96.6
2.50—2.99	8	347,000	1.9	98.5
3.00 and over	6	278,000	1.5	100.0
Total	66	18,049,000	100.0	

TABLE III—CHANGE IN MARGIN PER TON OF TEN RAILROAD COAL COMPANIES, 1913-1923

(Margin for 1919 to 1923 adjusted so as to be comparable throughout period)

Period	Margin (Adjusted)	Period	Margin (Adjusted)
1913	$0.33	1920	$0.56
1914	0.39	1921	0.85
1915	0.33	1922 year	Loss 0.10
1916	0.41	1922 first quarter	0.59
1917	0.63	1922 4th quarter	1.15
1918	0.41	1923 1st quarter	1.18
1919	0.61		

of properties which could not be operated under more active competition, and has further made it to the interest of the producer to extract a larger percentage of the coal in the ground than was formerly the practice. It is conceivable, if not probable, that if faced by the absolute necessity of reducing costs, the industry would find means to mine coal more cheaply, but this result could not be accomplished quickly and would almost certainly entail waste of the resources.

This report of the Commission presents a summary of its investigations on margins as well as on profits, the signed report being accompanied by special staff reports on each of these subjects, both prepared under the general direction of David L. Wing. In its discussion of margins the Commission points out that the average margin is not in itself a safe measure of profit, although changes in margins show whether profits are increasing or decreasing.

"Compared to the margins before the war, present-day margins show a large increase. In the four years before the United States entered the war the average margin for the railroad coal companies was 37c. a ton. In 1919 the average margin (adjusted—see table III) was 61c. In 1920 and 1921 for these 10 companies it was 56c. and 85c., respectively, the variations in these years representing in part changes in price, in part the movement of steam sizes in and out of storage to the market. The average for 1921 was thus more than twice as great as the pre-war average.

'During the five-months' strike of 1922 the companies lost money heavily and operations for the year as a whole showed a loss. After the resumption of mining, however, margins rose to the highest point of record in the ten years. For the last quarter of 1922 the average of the railroad coal companies was $1.15, and in the first quarter of 1923 it was $1.18, or more than three times the pre-war average. The large margins of late 1922 and early 1923 were due in part to the active demand for steam sizes and in part to the fact that the railroad coal companies advanced the price of domestic coal slightly.

"The increase in margin over the pre-war years is in part attributable to federal income and excess-profit taxes, which are included in the margin and which before 1917 were negligible in amount. The average amount of federal taxes per ton of all coal produced by the railroad coal companies was found to be approximately 11c. Even after deducting federal taxes therefore the margin shows a large increase over pre-war years."

The evidence of the margin as to profits of anthracite operators is summed up by the Commission as follows:

"There is normally a wide variation in margins between the low-cost and the high-cost operators. Some operators make very large margins and others very small margins. Still others frequently have to sell below cost.

"Present margins are much larger than pre-war, even allowing for federal taxes. The margin in the six months following the strike was the highest on record, partly because of market conditions which are not expected to be permanent, partly because of an advance in the circular price.

"Labor costs and other costs also show a large increase over pre-war figures, but the increase in price has been such that the operators' margin since the war has been about the same percentage of the sales realization as before."

TABLE IV—DIVISION OF PURCHASER'S DOLLAR F.O.B. MINE BETWEEN MARGIN AND COST

(Thirteen companies, adjusted margins)

Period	Cents of net sales realization dollar: Labor Cost	Supplies	General Expense	Margin
1913–16 (average)	61.3	12.3	13.4	13.0
1919	64.4	14.6	9.7	11.3
1920	65.2	14.5	11.0	9.3
1921	63.0	13.7	10.8	12.5
1922 year	71.1	14.0	17.0	2.1 loss
1922 1st quarter	66.2	12.6	12.6	8.6
1922 4th quarter	59.9	10.8	11.2	18.1
1923 January to March	59.5	10.8	11.5	18.2

Per Cent Return on Investment.—The Commission found itself confronted with conflicting claims as to the basis upon which the rate of income should be reckoned, and it outlines the theories, without, however, committing itself to any one. One claim is that the current market value is the proper measure of value. Another that the income should be reckoned upon original cost; another that it should be determined with reference to cost of reproduction.

The Commission "has deemed itself justified in finding as a fact that the mining and transportation of coal in interstate commerce impresses that commodity with a public use. The problem of valuing anthracite therefore while not strictly analogous, bears some resemblance to the problem of valuing a public utility for the purpose of regulating rates. It will be found that the courts have laid down a single formula for ascertaining value. Each case seems to rest upon its own merits and the courts have considered original cost, stock and bond issues, and the cost of reproduction and have been governed in their decisions sometimes by one element and sometimes by another. As the Commission is not called upon to determine judicially the valuation of these properties, it does not deem it prudent to lay down a rule for making such valuation. The Commission has rather deemed it to be its duty to set forth for the use of Congress and the public all the information on these subjects which it has been able to obtain."

In order to arrive at an estimate of market values, the Commission secured without compensation the services of a committee of engineers who, it says, "through technical training and many years of experience as experts in the appraisement of coal-mining properties, were especially qualified.

"The method employed is that adopted by engineering experts in valuation of mining properties; that is, the basis being the present and the estimated future earnings. The objection to the valuation of properties in the anthracite field is that this basis is that of earnings derived from inherent monopolistic conditions, the uncertainty as to future mining costs and future realization margins—two factors highly speculative. Nevertheless, this method of valuation is that which is employed by the experts representing capitalists desirous of investing in anthracite mining properties, and is the accepted practice in such transactions involving value of particular tracts.

"The committee's estimate, including both physical property and working capital, also covers the value of lands not owned by operating companies. The committee's valuation is as follows:

Present valuation of lands now operated, including development, plant and equipment, and working capital	$843,500,000
Present valuation of reserve tonnage	146,400,000
Total present valuation	$989,900,000

"The Commission says 'that the current market value determined on this basis is not a satisfactory base against which to determine whether or not the anthracite companies have been using their monopoly powers to extract unreasonable profits,' and points out that 'if the estimate of the engineers correctly appraises the present market value of this industry it also measures the increment in value to the owners of the land.' "

Book values of the companies examined by the Commission's field accountants "after deducting outside investments, amount to $520,000,000 with working capital included (counting the memorandum accounts of the Pennsylvania Coal Co., and Hillside Coal & Iron Co. as a part of the book value). The companies examined produced 85 per cent of the output and own in fee 81 per cent of the coal. If they represent a like percentage of the total investment in anthracite mining, the book value would be in the neigh-

TABLE V—BOOK FIGURES OF COAL INVESTMENT AND COAL INCOME, AND IDENTIFIED REVALUATIONS, 1921

	Pennsylvania & Hillside	Lehigh Valley & Coxe Bros.	Philadelphia & Reading	Scranton Coal	Lehigh & Wilkes-Barre	Lehigh Coal & Navigation	Hudson Coal Co. Interests
Total assets as per books	$26,367,000	$80,656,000	$114,862,000	$5,079,000	$39,266,000	$77,151,000	$85,326,000
Net income as per books	6,126,000	4,012,000	3,482,000	291,000	5,836,000	3,034,000	4,098,000
Total investment in coal operations, adjusted *a*	13,026,000	46,301,000	97,198,000	4,126,000	28,974,000	31,966,000	51,298,000
Total income from coal operations, adjusted before deducting federal tax	5,950,000	5,831,000	4,119,000	465,000	8,707,000	678,000	4,496,000
Per cent of return on investment in coal operations	45.7	12.6	4.2	11.3	30.0	2.1	8.8
Revaluations of assets, 1913-1921	.....	38,550,000	12,000	.....	969,000	11,244,000	27,538,000
Revaluations identified prior to 1913	.....	3,500,000	*b*7,000,000	.....	5,200,000	4,970,000	*c*5,500,000

a Average of investment as figured from the companies' balance sheets at the beginning and end of the year.
b Approximate.
c Minimum.

borhood of $600,000,000 or $640,000,000 working capital included. In other words, the estimate of the committee indicates a market value some hundreds of millions in excess of the values now on the books of the companies, representing therefore a capitalization of monopoly profits."

The cost of reproduction is not a figure that can be obtained with respect to the anthracite industry because the largest values are in land and unmined reserves, "to which, of course, reproduction cost cannot apply." The values carried on the books of the anthracite companies, as found by the field accountants of the Commission, represent in most instances a figure below present market value, as estimated by the engineers, but above original cost. Like original costs and market values, the book figures are to be accepted as throwing light on the rate of profit although not conclusive evidence thereof.

What the books show is summarized in table V.

Commission Investigates Original Cost.—The report reviews at length the Commission's investigations into the original cost of the anthracite properties. It points out that all but two of the railroad coal companies other than the Pennsylvania and Hillside wrote up the values of their land for tax purposes some time between 1913 and 1921. The amount of these revaluations of property assets identified by the accountants in the books of each are shown on the last two lines of table V.

"The revaluations made between 1913 and 1921 by the railroad coal companies in the table totaled $78,000,000, not including the $40,000,000 in the memorandum account of the Pennsylvania and Hillside companies. In addition to the companies here shown, revaluations to the amount of $15,500,000 were found on the books of the independent companies examined. To this should be added the appreciation of values which took place when the Delaware, Lackawanna & Western R.R. sold its property to the Glen Alden Coal Co. in 1921. Assets which at the time of sale showed a value of $6,240,000 on the railroad company's books were entered on the Glen Alden Coal Co.'s books at $72,240,000, an increase of $66,000,000.

"The total increase in the book values of the companies examined arising from appreciation of values has thus amounted, since 1913, to approximately $159,800,000 exclusive of $40,000,000 in the memorandum account of the Pennsylvania and Hillside companies.

"The Commission was unable to obtain figures of the original investment; neither the records of the present operating companies nor the resources of the Commission were adequate for this purpose. As has been found by the Interstate Commerce Commission in the valuation of the railroads, accurate records of original cost in many instances do not exist. The most that the present Commission has been able to do is to set down the items of appreciated value which could be identified on the books, and it is probable that other appreciations of value not identified by the accountants have been placed on the books even during the life of the present operating companies.

"The total amount of appreciation of values identified both before and since 1913 was approximately $186,000,000 exclusive of $40,000,000 in the memorandum account of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co.

"Those who hold to the theory of original investment as the basis for reckoning profit may, if so disposed, deduct these revaluation items from the book values in order to derive a figure closer to the original cost than the book values themselves. The Commission itself does not feel justified in making the deduction, for several reasons. In the first place, it is not sure that all the appreciations in value were discovered. Again, the depletion allowances which have occasioned many of these write-ups have not yet been finally settled with the Treasury Department and are, therefore, subject to change.

"Again, the Commission cannot guarantee in all instances that the assets revalued are exclusively concerned with the production and sale of coal, though most of them relate to coal lands. Finally, some of these entries are explained by the companies as restoration to capital accounts of amounts previously charged off through excessive depletion and depreciation, or of improvements charged directly to operating expenses. In view of the accounting practice of some of the companies it is likely that the book values of plant and equipment are in some instances less than the original cost and subsequent improvements.

With these uncertainties still attaching to the entries it would be a departure from the Commission's procedure of strict conformity with the written records of the companies to make the deductions and to calculate the per cent of return on the resulting investment. The figures are, however, here presented for the use of those who desire to approximate original cost as closely as may be from the facts now at hand."

Increase in Net Income 1913-1922.—The figures of net income confirm the evidence of the margin per ton that the operators have been receiving larger returns since the war than before, says the report. In table VI is shown the combined net income from coal operations of all the railroad coal companies except the Glen Alden. From an average of $13,000,000 in the three years 1913 to 1915 the income rose to $33,000,000 in 1920. In other words it increased two and a half fold. In the following year, 1922 as a whole, the income was by far the smallest of the ten-year period but it is to be expected from the evidence of margin per ton that 1923 will show a relatively high income. Out of the increased income, it should be noted, federal taxes must be paid.

Table VII shows the dividends paid (exclusive of stock dividends) by the railroad coal companies for the years 1913 to date. The dividends are shown in two ways: first, in per cent of par value of capital stock; and second, in dollars and cents per ton of coal produced. The very high rates of dividends paid by certain of the companies should be considered in the light of their small capital stock, and in the first two lines of the table the figures of total assets and capital are given for each company for purposes of reference.

In table VIII are given the earned surpluses of the railroad coal companies as distinct from surplus arising through revaluation of assets. The first column of the table shows the surplus of the six railroad coal companies that have been paying dividends in recent years and that are engaged exclusively in the mining and selling of coal. The surplus

TABLE VI—NET INCOME FROM COAL OPERATIONS BEFORE DEDUCTING FEDERAL TAXES, 1913-1922—RAILROAD COAL COMPANIES

Period			Period	
1913	*a*	$16,039,000	1918	22,369,000
1914	*a*	11,814,000	1919	25,220,000
1915	*a*	11,264,000	1920	33,466,000
1916	*a*	14,832,000	1921	30,246,000
1917		29,997,000	1922 (strike year)	6,249,000

a Total of certain companies' reports for fiscal year and others for calendar year.

TABLE VII—DIVIDENDS PAID BY NINE RAILROAD COAL COMPANIES, 1913-1922, EXCLUDING STOCK DIVIDENDS

	Pennsylvania Coal Co.	Hillside Coal & Iron Co.	Lehigh Valley Coal Co.	Coxe Bros. & Co., Inc.	Phila. & Reading Coal & Iron Co.	Scranton Coal Co. Interest	Lehigh & Wilkes-Barre Coal Co.	Lehigh Coal & Navigation Co.	Hudson Coal Co.
Total assets, Dec. 31, 1922	a$16,316,864	a$3,283,875	$68,245,151	$8,154,085	$115,064,815	$4,697,333	$39,127,208	$77,018,864	$42,100,782
Capital stock, Dec. 31, 1922	5,000,000	1,000,000	9,465,000	2,910,150	8,000,000	260,000	9,210,000	29,243,400	16,134,250

Dividends Paid	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton	Per Cent	Per Ton
1913	49	$0.44	....	....	....	....	$ 17	$0.37	....	$	....	$	$ 13	$0.23	8	$b	17	c
1914	10	.09	....	....	....	....	9	.21	....	....	....	....	13	.23	8	b	20	c
1915	10	.09	....	....	....	....	15	.32	....	....	....	....	13	.25	8	b	20	c
1916	31	.29	25	0.18	....	....	d30	d.42	....	....	....	....	13	.28	8	b	20	c
1917	110	.92	105	.69	25	0.32	25	.46	....	....	....	....	13	.26	8	b	7½	c
1918	83	.72	45	.29	21	.26	10	.18	....	....	....	....	13	.27	8	b	7½	c
1919	54	.52	80	.56	8	.13	9	.16	....	....	....	....	13	.29	8	b	7½	c
1920	59	.66	70	.57	134	1.93	92	1.74	....	....	....	....	13	.31	8	b	7½	c
1921	137	1.30	205	1.51	72	1.03	83	1.52	....	....	....	....	227	4.10	8	b	7½	c
1922	168	2.76	190	6.69	21	.53	20	.72	....	....	....	....	23	.49	8	b	7	c

a Memorandum accounts for depletion and depreciation purposes indicate value of $40,000,000 in addition to these amounts.
b Since the larger part of this company's net income is derived from transportation facilities, rate of dividend per ton is omitted.
c On account of operating agreements between Hudson Coal Co., Delaware & Hudson Co. Coal Department, and Northern Coal & Iron Co. rate of dividend per ton for the Hudson Coal Co. is omitted.
d Eighteen months.

of these six companies rose from $9,700,000 in 1912 to $53,000,000 in 1919. In other words it increased more than five-fold in seven years. In 1920 it decreased slightly, chiefly because of the payment by the Lehigh Valley out of its surplus of a dividend of 134 per cent. In 1921 the combined surplus fell to $37,000,000, chiefly because of the payment out of surplus of another dividend of 227 per cent, this time by the Lehigh & Wilkes-Barre. Other large dividends were paid during the year, notably $2,050,000 by the Hillside, equivalent to 205 per cent on its small capital stock, and $6,850,000 by the Pennsylvania Coal Co., on its capital of $5,000,000.

The Glen Alden Co., which took over the coal properties of the Delaware, Lackawanna & Western Railroad Co., in August, 1921, was omitted from the preceding tables by the Commission because the change of ownership makes it impossible to set up the accounts on a comparable basis. Were the company included the profits of the industry would appear larger. Its mine had the lowest average cost of any large operator in the region during the four-year period, 1919-1922. Its margins are, therefore, large and its earnings correspondingly so. For example, in the first quarter of 1923, the average margin of the other railroad coal companies was $0.93 per ton. The margin of the Glen Alden was $1.48. Including the Glen Alden the margin for all the railroad coal companies was $1.04. In other words the average with the Glen Alden included was 11 per cent higher than with it excluded.

The Commission was unable to obtain a separation of the coal accounts and the railroad accounts of the Delaware, Lackawanna & Western Railroad Co. that would permit a statement of income from coal applied to investment from coal. It is a matter of common knowledge, however, that the business was highly profitable, and that the coal-mining department contributed largely to the prosperity of the combined enterprise. The dividends paid by the Delaware, Lackawanna & Western Railroad Co. have been as shown in Table IX.

Carrying Charges of Coal-Land Reserves.—"The greater part of the investment of the anthracite operators consists of coal-bearing land. Where, as is the case with a number of companies, lands are held which cannot be developed at the present rate of output for some generations to come, the carrying charges become a serious burden. The taxes upon the undeveloped lands are charged to operating costs. The interest is not properly chargeable against cost, but it must come out of the margin. Carrying charges on excessive reserves are one reason why some of the substantial companies pay small dividends or no dividends at all.

"To ascertain the effect of such charges upon the profits of the companies examined, the Commision obtained the services of D. C. Ashmead, formerly of the Comimssion's engineering staff and later of the Bureau of Mines, to estimate the probable life in years at the present rate of output of each of the companies whose accounts were examined. From the information furnished by the companies to the Commission Mr. Ashmead has estimated the total tonnage of recoverable coal in the lands controlled by each company, and has divided this by the company's present rate of annual output.

"The Commission does not itemize the individual estimates. In order, however, to show the wide range in the amount of reserves carried by the several companies, table X has been prepared, in which each operating interest is shown by a code number only. The table gives for each interest the life of the property in years at the present rate of output, including all coal, whether owned or leased, now controlled by the interest. The table also gives the per cent of the tonnage controlled by the corporation that is in fee and the per cent in leasehold. To illustrate, company No. 3, has coal enough in the ground to keep on operating for 123 years at the present rate of output, and all of this coal is owned by the operating company. Companies No. 7 and 8 have coal enough for 98 years of operation of which 59.5 per cent is owned in fee and 40.5 per cent is controlled under lease.

"The outstanding example of excess reserves of coal-bearing lands is the Philadelphia & Reading Coal & Iron Co., which owns 85,000 acres of coal lands. According to a semi-official estimate made some years ago the coal in these lands is sufficient to last for 216 years. The engineering department of the Coal Commission estimates the life of the property at a still higher figure. The taxes on the excess land add to the already high production cost of the Reading and reduce its margin. Freed from this extra tax burden the margin might be sufficient to pay a modest return if applied to a simple investment in operating properties. Spread

TABLE VIII—INCREASE IN ACCUMULATED SURPLUS OF THE RAILROAD COAL COMPANIES

(Exclusive of revaluations of assets)

Year	Six Coal Companies Paying Dividends	Companies paying no Dividends: Lehigh Coal & Navigation Co.a	Philadelphia & Reading b	Scranton Coal
1912	c9,688,000	$1,655,000	$1,460,000	$936,000*
1913	c13,295,000	1,884,000	2,599,000	911,000*
1914	c17,091,000	2,390,000	3,315,000	721,000*
1915	c24,522,000	2,770,000	3,375,000	730,000*
1916	c30,028,000	3,452,000	6,550,000	537,000*
1917	34,527,000	5,238,000	11,986,000	114,000*
1918	39,107,000	5,712,000	16,146,000	349,000*
1919	53,063,000	6,177,000	19,013,000	44,000*
1920	52,094,000	7,434,000	25,685,000	154,000
1921	37,108,000	8,075,000	29,167,000	460,000
1922	27,245,000	7,467,000	29,074,000	32,000*

* Deficit.
a Includes surplus accumulated out of transportation income.
b Company paid little or no interest on advances to it from holding company during this period.
c Total of certain companies' reports for fiscal year and others for calendar year.

TABLE IX—DIVIDENDS PAID BY DELAWARE, LACKAWANNA & WESTERN RAILROAD CO.

	Per Cent		Per Cent
1909	70—cash a; 15—stock	1916	20
1910	20	1917	22½
1911	55b	1918	20
1912	20	1919	20
1913	20	1920	20
1914	20	1921	18—cash; 100—stock
1915	20	1922	12

a Extra dividend to enable stockholders to purchase stock of the newly organized Delaware, Lackawanna & Western Coal Co.
b Including 35 per cent in securities of the Lackawanna Railroad Co. of New Jersey.

TABLE X—YEARS LIFE OF COAL IN GROUND CONTROLLED BY COMPANIES WHOSE BOOKS WERE EXAMINED

(Figures represent years the coal owned or leased by each operating company or interest will last at present annual rate of output)

Company	Life in Years	Per Cent of Coal in Fee	Per Cent of Coal in Leaseholds
1	480	100.0	.0
2	260	86.8	13.2
3	123	100.0	.0
4, 5	115	98.0	2.0
6	109	.0	100.0
7, 8	98	59.5	40.5
9	70	.0	100.0
10	65	81.1	18.9
11	60	4.7	95.3
12, 13, 14	53	94.3	5.7
15	49	81.4	18.6
16	48	50.0	50.0
17 and 17a	39	82.1	17.9
18	32	.0	100.0
19	29	40.6	59.4
20, 21, 22	28	5.0	95.0
23	27	.0	100.0
24	21	.0	100.0
25	19	.0	100.0
26	18	100.0	.0
27	10	.0	100.0
28	10	17.8	82.2
29	8	.0	100.0
30	8	.0	100.0
31	7	.0	100.0
32	Mined out	.....	.....

over this vast future reserve, the actual margin has paid a very small return.

"At first sight it would appear that the Philadelphia & Reading Coal & Iron Co. has been extremely unprofitable. Its production cost has indeed been high. The peculiar difficulty of the Reading has apparently been to pay the taxes and interest on its enormous reserve of coal lands. Had the anthracite business been an ordinary competitive business and the Philadelphia & Reading Coal & Iron Co. an ordinary competing business enterprise one of two things would have happened long ago. The company would either have been forced out of business *or else forced to sell part of its coal lands to someone else.* The thing that saved the Reading Coal & Iron Co. was the absence of effective competition, due to the peculiar economic organization of the anthracite industry.

"The Supreme Court of the United States has declared this combination of the [Reading] railroad and coal companies to be in violation of law and has ordered a dissolution. This is in line with good public policy. The business of mining and transportation should be kept separate, not intermingled, as now, in a maze of accounts.

"The Commission insists that the dissolution ought not to be made the occasion for further increases in the price of coal. The coal company has been operating under an arrangement by which the railroad paid the carrying charges on the excess coal lands. If this arrangement is illegal, the excess reserve should be taken care of by some other means than through an advance in the price. The American people do not want their coal at prices that will not yield a fair profit, but they do not believe that it is an inherent right of any corporation to embark on a two-hundred-year speculation in land and ask the public to pay the cost of carrying it out of the present price of coal.

"Summary and Conclusion.—The principal facts found by the Commission in its investigation of anthracite profits are:

"(1) No average figure either of margin per ton or per cent return on investment can fairly represent the profit in anthracite mining. Because of great inequalities in cost and in selling arrangements some operators make very large profits and others very small profits. The margins per ton between cost and sales realization in ordinary times range from less than nothing to over $2 a ton. The per cent return on book value of investment in coal ranges all the way from a loss to 138 per cent (one independent operator, year 1917).

"(2) There has been a very large increment in value so that the lands are now worth on the market more than they used to be although a third of the coal is gone. The Commission could not obtain the original cost of more than one or two of the properties. It did find that the present book values contain certain "Write-ups" or revaluations of assets amounting to at least $186,000,000 and in addition there were memorandum accounts kept for Federal Tax purposes indicating further appreciation of $40,000,000.

"(3) The latest of the foregoing revaluations, however, was as of 1913. Since 1913 a further huge increment in market value has accrued to the owners of the property. A committee of engineers appointed by us estimates the present market value of mines and minerals as $989,000,000. The book values, allowing for companies and holdings not examined by the accountants, are in the neighborhood of $600,000,000. This indicates a further increment of hundreds of millions of dollars inuring to the owners if the engineers' estimates based on earnings are accepted.

"(4) The profits are increasing. Total net income is increasing, dividends are increasing, and surpluses are increasing, earned surpluses as well as surplus arising through revaluations. The margin per ton is increasing.

"During the year 1922, when there was a five-months strike, the average total f.o.b. mine cost for the year as a whole exceeded the sales realization of the operators. Their margins per ton for the last quarter of 1922 and the first quarter of 1923 were the largest on record. Though the market conditions of 1923 are not expected to last, it is found that the present margins show a large increase over pre-war, even after deducting federal taxes.

"(5) Labor cost and other costs also show a large increase over pre-war figures, but the increase in price has been such that the operator's margin since the war has on the whole been about the same percentage of the sales realization that it used to be.

"(6) The practice of many companies of carrying large reserves of coal lands held for future use adds to costs through taxation and conceals profits. The largest of the railroad coal companies—the Philadelphia & Reading, a high operating cost company—is overburdened with reserves sufficient to last more than two hundred years. On this total investment it has shown an inadequate return, the loss having been made up by the large earnings of the affiliated railroad. Freed from the carrying charge of this excess reserve it could make an adequate return.

"The amount of the increment in value of coal lands is a matter deserving careful consideration, not only with respect to anthracite but also with respect to bituminous coal. If this increase in market value is to continue indefinitely piling up carrying charges to be added to current prices, an intolerable burden will be laid on the consumer. Taxes and interest on coal not to be mined within forty years are not properly chargeable to present operations. Speculation in land should not be confused with mining coal.

"We make the following specific recommendations for the attention of the industry, the states and the Federal Government:

"(1) In order to permit the public as a whole to share in the good fortune of the low-cost, high-profit operator, we recommend that differential taxation shall be applied to differential advantage. Sweeping horizontal cuts cannot be made in present mine prices and margins without serious injury to many high-cost operators, whose output is needed. Taxes falling lightly on the low-profit operator and more heavily on the high-profit operator in proportion to his ability to pay will benefit the consumer indirectly through lightening the tax burden elsewhere and will accomplish this without raising prices.

"(2) To protect the public against unjustified increases in price, we recommend complete publicity of accounts through a federal agency with power to compel reports, and to prescribe the form of accounts. Because of the large increase in operators' margins per ton since the strike of 1922, and the possibility of further increases in price as a result of the recent settlement, we believe that such current publicity as to costs, margins and profits should begin at once. Unless the public is protected by publicity of accounts, we are apprehensive that the concentrated control of the industry may take indefensible profits.

"(3) The consumer has in his own hands a measure of protection against unreasonable profits. We commend to consumers the use of substitute fuels."

Explosion in Glen Rogers Mine Kills 27

A gas explosion in one entry of the Raleigh Wyoming Coal Co. mine at Glen Rogers, W. Va., just as the men were starting work Nov. 6, caused the death of twenty-seven miners. Sixty-three men had checked in at the mine mouth that morning, and it is believed that the thirty-six survivors owe their escape to the modern ventilating system with which the mine was equipped.

Carl Scholz, vice-president and general manager of the Raleigh Wyoming Company, and R. M. Lambie, chief of the state mining department, could assign no cause for the explosion. In some manner unexplained, gas had accumulated in the entry where the blast occurred, but how it came to be ignited is not known at the present time.

The mines were not working the night before the explosion although until recently double shifts had been operating regularly. Through the night 28,000 cu.ft. of air had been passing through that heading, and the large ventilating fan had never stopped for a minute. Two night firebosses had made an inspection of the mine at 7 o'clock on the morning preceding the explosion and reported it safe.

QUESTIONS INVOLVED in the case of the Diamond Coal & Coke Co., versus the Oregon Short Line R.R. will be argued before Division 4 of the Interstate Commerce Commission in Washington Dec. 21. The case of the Southwestern Interstate Coal Operators' Association versus the Arkansas Western Ry. will be argued in Washington Dec. 28. The traffic questions raised by the South Side Lumber & Coal Co., the Peoples Coal & Material Co., and the Citizens Coal & Supply Co. will be considered at an Interstate Commerce Commission hearing in Indianapolis Dec. 4. Examiner Carter will preside.

BANKERS' ACCEPTANCES, secured by warehouse receipt, are eligible for rediscount by Federal Reserve banks when used to finance the storage of coal on docks, provided they comply as to maturity and in all other respects with all other provisions of the Federal Reserve Act and the board's regulations, says a ruling of the Federal Reserve Board. The ruling, which was made in response to a request as to the validity of such financing, also provides that the acceptances, secured by warehouse receipts, are eligible for acceptance by member banks.

September Mine Fatalities at Low Level

Fatal accidents at coal mines in the United States during September, 1923, numbered 137, according to a report by the U. S. Bureau of Mines. The fatality rate was 2.79 per million tons, based upon 49,133,000 tons of coal produced during the month, as compared with a rate of 5.11 for the preceding month based on a production of 57,732,000 tons and of 3.87 for September last year based on an output of 44,488,000 tons. The fatality rate for bituminous mines alone was 2.62 as compared with 3.76 for the same month last year; the rate for anthracite mines was 5.49 as compared with 4.73. The average fatality rate for September for both classes of mines during the past ten years was 3.66 per million tons. Thus the rate for September, 1923, was not only lower than that for September last year but it was also much below the ten-year average rate for the same month.

The fatalities during September brought the total number of deaths in 1923 to 1,900, indicating a fatality rate of 3.92 per million tons, as against 1,234 fatalities during the same period last year, representing a rate of 4.11 deaths per million tons. The 1923 rate indicates a decrease of between 4 and 5 per cent.

The present year's record to date for all fatalities from all causes shows a reduction in the fatality rates per million tons for falls of roof and coal, haulage, explosives and electricity, and an increase in the rate for gas and dust explosions, as shown by the following figures:

	1922	1923
Falls of roof and coal	2.000	1.803
Haulage	0.760	0.670
Gas and dust explosions	0.393	0.642
Explosives	0.183	0.167
Electricity	0.183	0.134

COAL-MINE FATALITIES DURING SEPTEMBER, 1923, BY CAUSES AND STATES

(Compiled by Bureau of Mines and Published by *Coal Age*)

State	Underground												Shaft					Surface						Total by States	
	Falls of roof (coal, rock, etc.).	Falls of face or pillar coal.	Mine cars and locomotives.	Gas explosions and burning gas.	Coal-dust explosions (including gas and dust combined).	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip, or bucket	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes	Railway cars and locomotives.	Other causes.	Total.	1923	1922
Alabama	3	....	2	1	.....	....	....	1	....	....	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	7	5
Alaska	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Arkansas	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Colorado	1	....	....	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	1	2	6
Illinois	11	....	3	2	.....	....	....	1	....	....	....	....	17	....	....	....	....	....	....	....	....	....	....	....	....	17	20
Indiana	5	....	1	....	.....	....	....	....	....	....	....	....	6	....	....	....	....	....	....	....	....	....	....	....	....	6	3
Iowa	1	....	1	....	.....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	3
Kansas	....	....	....	....	.....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	1	1
Kentucky	3	....	1	....	.....	....	....	..	....	....	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	4	5
Maryland	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	1
Michigan	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Missouri	1	....	....	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	0
Montana	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	2
New Mexico	....	1	1	....	.....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	0
North Dakota	....	....	....	....	.....	....	....	..	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	....	....	0	2
Ohio	10	....	2	....	.....	....	....	....	....	....	....	....	12	....	....	....	....	....	....	....	....	....	....	1	1	13	5
Oklahoma	1	....	1	....	.....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	2	1
Pennsylvania (bituminous)	21	....	3	....	.....	....	1	....	3	1	1	....	1	31	....	....	....	....	....	....	1	..	....	....	1	32	36
South Dakota	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Tennessee	....	....	1	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	4
Texas	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0
Utah	1	....	....	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	1	2	0
Virginia	1	....	....	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	1
Washington	1	....	....	....	.....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	2
West Virginia	12	1	6	3	.....	....	....	3	..	1	....	....	26	....	....	1	....	1	....	....	....	....	....	....	....	27	43
Wyoming	....	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	8
Total (bituminous)	72	2	22	6	.....	1	....	8	1	2	....	1	115	1	.....	1	..	2	....	1	..	.....	....	3	4	121	148
Pennsylvania (anthracite)	3	1	2	1	.....	2	....	2	..	....	....	2	13	....	.....	1	..	1	....	....	....	.....	....	2	2	16	24
Total, September, 1923	75	3	24	7	.....	3	....	10	1	2	....	3	128	1	....	2	..	3	....	1	..	.....	....	5	6	137	....
Total, September, 1922	64	10	31	2	6	11	1	14	2	1	....	4	146	2	.....	6	..	8	5	2	3	1	1	6	18	....	172

Engineers' Valuation Committee

Appraises Anthracite Industry at $989,900,000; That of Soft Coal at $11,442,864,000

Norris Report to Be Submitted to Congress Though Not Accepted by Coal Commission—Valuation of Coal Industry Arrived at by Capitalizing Present and Expected Profits

IN ITS report on investments and profits in the anthracite industry the Coal Commission makes reference to a study of the valuation of the coal industry undertaken at its request by a voluntary committee of "especially qualified" engineers. This committee, of which R. V. Norris, of Wilkes-Barre, was chairman, the other members being S. A. Taylor and Howard N. Eavenson, of Pittsburgh; H. M. Chance, of Philadelphia, and J. H. Allport, of Barnesboro, Pa., made a report to the Coal Commission on the present value of both the anthracite and bituminous-coal industries. This report was not accepted by the Coal Commission, but will, it is understood, be transmitted to Congress with other supplemental data for printing in the completed report of the Commission.

Mr. Hammond authorized Mr. Norris, chairman of this Engineers' Advisory Valuation Committee, to make public the text of their report. This committee estimates the total present value of the anthracite industry, including reserves, at $989,900,000, and of the bituminous-coal industry at $11,442,864,000. The above figure for anthracite includes $146,400,000 as the present value of the reserve tonnage, and $5,156,650,000 for the reserve tonnage of bituminous coal and lignite.

The report points out that various methods of valuation have been suggested for mining properties, but that authorities seem to agree in accepting as the fairest, most practicable and logical a capitalization of the estimated future earnings if an estimate can reasonably be made. Hoover and Finlay are quoted as authorities on this point.

Cost, assessed valuations, sale value, royalty valuation and tonnage values were considered by the committee as possible means of arriving at a general value of the coal industry. The method adopted, and "used as far as practicable," was the present-value method for operating properties considered as covering the "available coal"—defined as that to be mined in forty years. Other coal was classed as reserves.

This Engineers' Committee used data available from the records of the Federal Trade Commission and the Geological Survey, and that material collected by the Coal Commission which was available when their study was made, in the late summer.

The report on valuation in detail follows:

Basis of Valuation.—The weighted average of data for the years 1920 and 1921, where such is available, was used as a base; first, because this was believed to fairly represent present conditions; second, any changes of conditions in costs would, we believe, be reflected in the realization; third, the data in the possession of the Commission is most complete for those years. Where the 1920-21 earnings were unavailable or misleading the most reliable available data was used.

As the total value of the properties is desired, costs are figured before royalty, depletion, depreciation and interest charges. Royalty in the case of leased and depletion in the case of fee lands represents the value of the undeveloped coal in the ground, depreciation the value of improvements and developments, and interest charges and profits the returns to capital used in operation. Federal taxes are a charge against income and must be deducted from the realization before it can properly be used in estimates of value.

Future tonnage is estimated from consideration of past tonnage and of reserves in each district.

Value of Operating Property.—From the above the value of the operating properties is determined by discounting at 6 per cent compound interest the net yearly returns, as a varying annuity estimated for each field for the period noted, the latter obtained by applying the values as above indicated, per ton to the estimated tonnage for each year.

Value of Reserves.—The reserve tonnage is determined by the difference between the operating tonnage as above and the total estimated tonnage in each field. This is considered as a whole in each field as undeveloped coal and its value is based on either actual sales or virgin areas where such values of recent date are available and sufficient to justify their general employment in the estimates, or, lacking that, on the present value of the reserve coal at the present rates of royalty, but considered deferred for the life of the operating lands.

Total Valuation.—Based on the above the total valuation is made up of the value of operating coal land and reserves, including development and equipment, as well as all land values, regardless of whether the ownership is in the operating company or the lands are operated under lease.

Anthracite Situation.—Reasonably complete data, as requested, were furnished by your statisticians, together with the Commission's estimate of coal.

Estimated Reserves of Anthracite

(In Gross Tons)

Field	Total Coal Remaining	Per Cent Recoverable	Recoverable Coal Remaining
Northern	3,276,763,000	67	2,195,431,000
Eastern Middle	248,628,000	69.4	172,548,000
Western Middle	3,573,025,000	58.1	2,075,928,000
Southern	9,256,260,000	49	4,535,567,000
Totals	16,354,676,000		8,979,474,000

From a study of past production we estimate as a conservative basis of value that the field as a whole can increase its output by 1935 to about 100,000,000 gross tons per year, and hold this average production to the end of the 40-year period allowed for available coal.

The reserves, mostly in the Western Middle and Southern fields, are expected to maintain an annual output of 100,000,000 tons for about ten years longer and then gradually decrease to 50,000,000 tons per year with a total life of about seventy years additional.

As important factors in production we estimate for the Northern field a life of fifty years, for the Eastern Middle thirty-five years, the Western Middle 100, and the Southern field 110 years. All of these fields, of course, will produce coal long after the above limits, but in small quantities and of negligible present value.

The Western Middle and Southern fields will have to carry on after the other two fields cease to be important factors. Owing to depth and to geological conditions which cause a much smaller percentage in production of domestic sizes, the coal from these fields is more costly to mine and brings a smaller realization on all sizes. As a natural consequence these fields are developed only to supply the surplus demanded by the market over that furnished by the cheaper Northern and Eastern Middle fields. These more costly fields have the greatest reserves, however, and can be expected to maintain a large production long after the more favored fields are exhausted.

The average royalty paid on all coal sold was found to be 16.5c. per ton, the average depletion 14.7c., and average depreciation charged on plant 10.8c. Valuing the available coal, plant and improvements on the basis of the returns

Estimate of Present Value of Coal Lands, Plant and Improvements, in the United States

State	Net Tons: Available for Mining Within 40 Years	Net Tons: Reserves of Present Value after 40 Years	Estimated Present Values: Available Tonnage, Including Plant and Improvements	Estimated Present Values: Reserve Tonnage	Estimated Present Values: Total
Alabama	1,020,000,000	32,000,000,000	$130,560,000	$162,000,000	$292,560,000
Arkansas	106,000,000	860,000,000	22,048,000	21,500,000	43,548,000
Colorado	680,000,000	157,000,000,000	144,160,000	157,000,000	301,160,000
Illinois	4,920,000,000	49,000,000,000	984,000,000	490,000,000	1,474,000,000
Indiana	1,640,000,000	25,000,000,000	229,600,000	125,000,000	354,600,000
Iowa	380,000,000	14,000,000,000	30,400,000	14,000,000	44,400,000
Kansas	354,000,000	14,000,000,000	49,560,000	14,000,000	63,560,000
Kentucky	2,290,000,000	60,000,000,000	421,360,000	600,000,000	1,021,360,000
Maryland	144,000,000	160,000,000	37,440,000	8,000,000	45,440,000
Michigan	72,000,000	30,000,000	11,520,000	900,000	12,420,000
Missouri	278,000,000	20,000,000,000	33,360,000	20,000,000	53,360,000
Montana — Bituminous	232,000,000	1,500,000,000	33,408,000	98,250,000	131,658,000
Montana — Lignite		181,500,000,000			
New Mexico — Bituminous	210,000,000	9,000,000,000	47,670,000	88,000,000	135,670,000
New Mexico — Sub-bituminous		86,000,000,000			
Ohio	2,640,000,000	32,000,000,000	485,760,000	640,000,000	1,125,760,000
Oklahoma	270,000,000	18,000,000,000	37,800,000	90,000,000	127,800,000
Pennsylvania	8,920,000,000	26,000,000,000	1,998,080,000	780,000,000	2,778,080,000
Tennessee	402,000,000	8,000,000,000	70,752,000	20,000,000	90,752,000
Texas — Bituminous	124,000,000	2,000,000,000	7,440,000	11,000,000	18,440,000
Texas — Lignite		12,000,000,000			
Utah	350,000,000	46,000,000,000	64,400,000	230,000,000	294,400,000
Virginia — Bituminous	660,000,000	10,000,000,000	132,000,000	201,000,000	333,000,000
Virginia — Anthracite		100,000,000			
Washington	178,000,000	32,000,000,000	35,600,000	80,000,000	115,600,000
West Virginia	5,540,000,000	61,000,000,000	1,196,640,000	915,000,000	2,111,640,000
Wyoming — Bituminous	494,000,000	40,000,000,000	71,136,000	350,000,000	421,136,000
Wyoming — Sub-bituminous		300,000,000,000			
*Miscellaneous — Bituminous		2,000,000,000			
*Miscellaneous — Sub-bituminous	96,000,000	4,000,000,000	11,520,000	41,000,000	52,520,000
*Miscellaneous — Lignite		350,000,000,000			
Total excluding lignite	.....	1,049,650,000,000	.....	.....	.....
Total lignite	.....	543,500,000,000	.....	.....	.....
Total	32,000,000,000	1,593,150,000,000	$6,286,214,000	$5,156,650,000	$11,442,864,000
Pennsylvania-Anthracite	3,907,900,000	5,071,600,000	843,500,000	146,400,000	989,900,000
Grand total	35,907,900,000	1,598,221,600,000	$7,129,714,000	$5,303,050,000	$12,432,764,000

* Miscellaneous includes Arizona, California, Georgia, Idaho, North Carolina, North Dakota, Oregon, South Dakota.

in the Commission's figures, discounted to the present time, and the reserves on probable margins deferred forty years, we estimate the present value of the properties comprising the Pennsylvania anthracite field as follows:

Available recoverable tonnage	3,907,900,000
Reserve tonnage	5,071,600,000
Total tonnage	8,979,500,000
Present value of plant, improvements and available tonnage	$843,500,000
Present value reserve tonnage	146,400,000
Total present value	$989,900,000

Bituminous Valuation.—In appraising bituminous coal your committee, in addition to considering recent earnings submitted, has given full consideration to all data available on earnings of earlier years, sales values, royalty rates, past performances, and present estimates of tonnage and value, which it believes to be most conservative and fully justified by the data obtained.

The total tonnage is based on estimates of the U. S. Geological Survey and of various state surveys, all revised and reduced to allow for losses in mining and for thin and unavailable coal. The total tonnages considered in the committee's estimate are actually materially less than half of the tonnage estimated by the U. S. Geological Survey as remaining at the end of 1920.

"Available coal" is estimated as that commercially minable within forty years, allowing for probable gradual increases in the rate of output to a total for the whole industry of 1,000,000,000 tons per year at the close of the 40-year period. *"Reserves"* are considered as such coal as would be available after the exhaustion of the "available" coal, excluding from any consideration all coal so situated as to be impracticable of access, and all coal so thin or of such depth as to have no present sale value.

In determining the amount of reserve coal an effort has been made to confine this item to coal which at the present time, or at least within the 40-year life of the "available" coal, would have actual ascertainable sale value, and be capable of beneficiation.

As the values of "available coal" were obtained by discounting probable earnings, these values necessarily include all working capital, plant, development, equipment, mine housing and other properties directly connected with the business. They do not include outside factors, as interest or rentals received, profits from connected undertakings as stores, farms, selling of purchased coal and the like. The values of reserves are those of the coal land only, which in general are far below the market price of similar lands in the same localities. It is the feeling of your committee that all the coal to be mined within forty years, whether from present or future operations, is included in "available coal" and that all reserve values should be treated as deferred.

The committee's estimate of the value of the coal properties of the country, not including coal in Alaska or in the island dependencies of the United States, is as shown in the accompanying table.

The value of the available tonnage, $7,129,714,000, is the minimum on which earnings should be based. Considerable amounts of reserve tonnage are and should be held by operators to protect their future interests, and earnings must be sufficient to cover the carrying of reasonable holdings of such reserves.

Plant.—The data presented are not sufficient to permit the determination of the actual value of plant and equipment, nor do we believe that it would be possible to obtain data on that subject that would be sufficiently accurate to warrant its general application. The total value of plant and equipment in the bituminous fields varies from $1 to about $3 per ton of annual output; in the anthracite region of Pennsylvania it is from $1.50 to as high as $4.50 per ton of annual output. Employee housing of good type costs, under present conditions, from $1 up per annual ton.

Your committee, having endeavored to be distinctly conservative in estimating both tonnages and values, desire collectively and separately to express most forcefully the opinion that the properties valued either as "available" or "reserve" could not be purchased in the open market except at a price far beyond the committee's estimates. The discount rates used—6 per cent for anthracite and 8 per cent for bituminous—are those adopted by the U. S. Treasury Department for income tax valuations.

Assigned-Car Order Now Set for Jan. 1

The Interstate Commerce Commission on Nov. 9 announced a further postponement of the date on which its order in the assigned coal car case becomes effective, fixing the new date as Jan. 1.

The order was to have become effective Dec. 1, but now it will not become effective until Jan. 1. Argument on the rehearing in the case will be heard Dec. 17, 18 and 19. It is regarded as probable that another postponement of the effective date of the order will be made prior to Jan. 1 because of the probability that the commission will not have reached a final decision on the rehearing.

Decisive Action Only Hope of Coal Trade Against Federal Control

Congress Leaders Ready to Push Legislation Sought by Coal Commission—Wadleigh Retirement a Setback—Commend Hoover Policy

BY PAUL WOOTON
Washington Correspondent of *Coal Age*

In the message which he will read to Congress less than three weeks hence the President is fully expected to urge the translation into legislation of the recommendations of the Harding Coal Commission. Administration leaders in both Houses are known to be ready to expedite such legislation. It is improbable that there will be opposition to this legislation from the Democrats as a party; the opposition will come from certain individuals in both parties. There is little likelihood that the coal legislation will be regarded in any way as a partisan matter.

It is known that a considerable number of the members of both houses are willing to go much further in the matter of regulation than the Coal Commission has suggested. In fact, the whole drift is toward federal regulation and away from self-regulation in the coal industry.

The coal industry is not aware, perhaps, that it is under the closest surveillance on the part of certain legislators. It is true that these men probably favor federal regulation, but they recognize that the one thing which can weaken support for regulatory legislation is determined action on the part of the industry itself, not only in the matter of the voluntary publicity pledged to the Coal Commission just prior to the conclusion of its work but along the lines of broad activities.

Two recent developments have done much to discourage action on the part of the industry. One was the striking unfairness of the Federal Trade Commission's report on anthracite. The other was the resignation of F. R. Wadleigh from the position of chief of the Commerce Department's Coal Division. The coal industry had faith in Mr. Wadleigh and was willing to embark on co-operation under his guidance. Time now is being marked until his successor will have been appointed. Neither the National Coal Association nor the American Wholesale Coal Association has named its members to serve on the Coal Division's advisory committee. If Mr. Wadleigh's resignation halts the mere naming of members on a committee, it is certain to hold up the formation of an actual plan for the voluntary submission of cost and wage data.

The unfortunate Federal Trade Commission incident gives ground for the industry to say that it always is abused and double-crossed by the federal government. It supports the position of those who are willing to go to the mat with the government on the whole question as to whether or not the government has the right to exercise any degree of control over private business activities—and many operators believe that the production of coal is entirely an intrastate activity, into the conduct of which the federal government may not legally pry.

Another influence which is working toward federal regulation of the coal industry is the apparent determination of the Department of Justice to hamstring trade associations. Its recent course in the case of the United States versus the Tile Manufacturers' Credit Association, in which the department is forcing an agreement that statistics of production, stocks and other things may be collected only at the request of a government agency, is frightening members away from these associations. Statistics such as trade associations collect are essential to business. Congress, recognizing that point, is likely to look with favor on compulsory returns to a government agency.

There are many who think industry should rally to the support of the policy followed by Secretary Hoover. He has urged the capitalization of the constructive forces within industry. He would encourage the forward-looking and the honest to put into effect voluntary efforts which would curb dishonest or gouging practices. He believes 95 per cent of the activities of trade associations are constructive and in the public interest. Unquestionably he regards regulation as a depressing and non-constructive step. It does not educate and encourage. It simply says: "Thou shalt not."

There are many who are wondering why the coal industry is allowing itself to drift at this critical time. No headway has been made in the simple matter of transmitting certain summaries of costs. There is a feeling in Washington that the coal industry would be well advised to get in touch with Secretary Hoover to see if more could not be done by way of expansion of the Coal Division so that studies could be made, in co-operation with industry, of the various suggestions made by the Coal Commission. It might be established that some of them are not practical. In other instances studies might be made which would be of benefit to the public and to the industry alike. The retailers might go to Mr. Hoover and suggest that he set up a section of the Coal Division which would study some of their problems. The wholesalers might do likewise.

Trade Commission Blames Wholesalers and Operators for High Anthracite Prices

Wholesalers who take exorbitant margins and operators who charge the wholesalers high prices are to blame for present "premium" prices that the public must pay for anthracite, according to a report issued Nov. 11 by the Federal Trade Commission. In the course of the report, the commission cites recent profits of $1.50 and $1.75 per ton on anthracite by wholesalers compared with pre-war margins of 10 to 15c. per ton.

"High prices exist in the wholesale trade either because they are charged by producers, or because of high margins taken by wholesalers," says the report. "At the present time they are due to both causes. About 25 per cent of the tonnage is being sold by the producers at 'premium' prices ranging from $9.85 to $12.25 per gross ton f.o.b. mines for domestic and from $6.75 to $9 for pea coal. Much of the anthracite sold at these prices goes directly from the producer to the retailer or consumer, but a part passes through the hands of wholesalers."

Figures for gross tonnage would be larger in the report, says the commission, if it were not that "a considerable number of wholesalers, including some of the largest, reluctant to let the public know what prices and margins they are realizing, have refrained from making reports." The commission reports that as a result of this failure to obtain facts, it is employing its coercive powers.

During the week ended Oct. 13 the highest margin taken by wholesalers reporting sales of anthracite at $10 or more per ton for nut and larger sizes and $8 for pea coal, was $1.75 per gross ton, taken on six cars sold at prices ranging from $12.75 to $13.75 per ton. In the following week the highest margin was $1.50 per ton taken on two cars sold at $13 and $12.75 per gross ton f.o.b. mines, respectively. Over against these high figures, during the week ended Oct. 13 six cars were sold at purchase price, one was sold at 50c. less, two at 75c. less, and one at $2 less than purchase price per ton. During the week ended Oct. 20 four cars were sold at purchase price and two at 25c. less than purchase price.

Presenting details on profits, the commission says:

"The exorbitant character of the higher margins can only be realized by a comparison with pre-war and war-time gross margins.

"Prior to the war the customary wholesalers' gross margin on domestic sizes of anthracite was from 10 to 15c. per ton, while during the war the Fuel Administration allowed 20c. per ton east of Buffalo. The U. S. Coal Commission, in its report on the wholesale and retail coal trade, shows that for the four years immediately preceding 1917, the average rate of return on investment for wholesalers, handling anthracite only, ranged from 12.5 to 27.5 per cent, while during 1918 they made over 25 per cent.

Commerce Commission Broadens Rate Probe; Soft Coal and Coke Included in Inquiry

The Interstate Commerce Commission on Nov. 9 broadened its order to investigate freight rates for anthracite to include rates on bituminous and semi-bituminous coal and coke from points in Virginia, West Virginia, Kentucky, Ohio and Pennsylvania to points in New England, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and the District of Columbia.

The order was entered, the Commission said, because of complaints of shortage of fuel for domestic and other uses in the New England States and other states included in the order and that it decided the scope of the inquiry should be enlarged "in order that the Commission may elicit information sufficient to enable it to take appropriate action to require the establishment of railway routes and reasonable rates that will insure transportation of an adequate supply of fuel to the destinations indicated."

Following hearings in Rochester and Albany, the first of last week, Chief Examiner Butler moved to New York, where on the 9th two sessions were held at which a few witnesses were questioned. Attorneys for the railroads were on hand to defend the present rates. A representative from the State of North Carolina, another the Chamber of Commerce of Trenton, and the Secretary of the Long Island Coal Dealers' Association were the principal witnesses, Mrs. Louise Reed Welzmiller, Deputy Commissioner of Markets, represented New York City.

The hearings were scheduled to be continued in Philadelphia on Nov. 13 and in Washington on Dec. 3.

Signs Decree Separating Lehigh Valley Railroad and Coal Properties

Segregation of the Lehigh Valley R.R. Co. from its coal properties is ordered in a final decree signed Nov. 8 by Judge Learned Hand in the U. S. District Court at New York City. It provides that the railroad shall dispose of all shares of stock, bonds and other evidence of indebtedness as is necessary to establish its entire independence of and from the coal companies. There remain the agreement as to trustees under the plan, the preparation of the stock and the necessary agreement of 85 per cent of the stockholders to the assessment of $1 levied for exchange of the stock.

The decree directs that the Lehigh Valley R.R. Co. shall, subject to the lien of its general consolidated mortgage, sell, assign and transfer its entire right, title and interest in and to the stock of the Lehigh Valley Coal Co., including the present right to vote and receive dividends thereon, to a trustee to be appointed by the court, but meanwhile, pending the appointment of a trustee, the coal company may pay the railroad company a cash dividend. The amended plan provides that the rights for subscription by Lehigh Valley R.R. stockholders for certificates of interest be extended until April 15, 1924.

Shareholders who buy certificates in the coal company must dispose of them before Dec. 31, 1927, if they have not in the meantime disposed of the railroad stock. If they have not done so the certificates will be called and the subscription price of $1 a share refunded. The plan provides that neither the railroad company nor any corporation controlled by it shall acquire any coal stock.

The Lehigh Valley R.R. Co. shall transfer to a trustee to be named by the court its right, title and interest in the stock of Coxe Brothers & Co., Inc., the trustees to hold said right, title and interest in said shares of stock until the maturity of the collateral trust agreement on Feb. 1, 1926. The amended plan further provides that the railroad shall transfer to a trustee its right, title and interest in the stock of the Delaware, Susquehanna & Schuylkill R.R. Co., to be held until the maturity of said collateral trust agreement.

One of the most interesting points made by Judge Hand was that "It will not constitute a contempt of this decree for the Lehigh Valley R.R. Co. to apply to the Interstate Commerce Commission for leave to retain the stock and to lease the property of the Delaware, Susquehanna & Schuylkill R.R. Co. or to merge and consolidate that company, provided that this provision shall not be construed as the expression by this court of any opinion as to the propriety of granting said application."

Another provision of the amended plan points out that "the Lehigh Valley Coal Co. and Coxe Brothers & Co., Inc., on the one hand, and the Lehigh Valley Coal Sales Co. on the other, their officers, directors, agents, servants and employees are hereby perpetually enjoined from further carrying out the contract dated March 1, 1912, cancelled and annulled by the decree or mandate entered by this court on Feb. 24, 1921, and from entering into any like contract in the future, the purpose and effect of which would be in any manner to hinder or restrain the Coal Sales Company from extending its business of buying and selling coal where and from and to whom it chooses with entire freedom and independence, or otherwise to violate the spirit and purposes of this decree."

Judge Hand further exhorts the parties to the decree to move with "due diligence" to carry out the provisions of the decree and asks that a written report of progress be handed to him within six months from the date of the decree.

Terre Haute Wants Mine-Rescue Station; Vincennes Team Slow at Hunt Fire

Federal aid in the establishment of a mine-rescue station in Terre Haute is to be sought, as a result of the tragedy at the Hunt mine, near Staunton, Saturday, Oct. 27, in which four lives were lost. Mine Workers' officials and Indiana operators expect to co-operate in backing a bill to be introduced by Representative Everett Sanders providing for an appropriation for this purpose.

Attention is called to the fact that the entire northern portion of the Indiana bituminous coal field has its center in Terre Haute and that with the paved highways radiating from there to all mines in the territory, they can be reached quickly. The nearest station at the present time is located at Vincennes.

Phil Penna, secretary of the Indiana Bituminous Coal Operators Association, and John Hessler, president of District No. 11, U. M. W., both issued statements that their organizations have always favored the location of such a station in Terre Haute and would assist Congressman Sanders all they could.

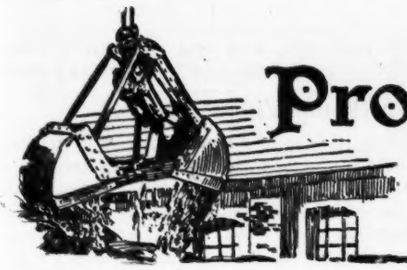
Much criticism was heaped upon the rescue team at Vincennes for its performance at the Hunt mine fire. Not only did the team require a long time to reach the mine but it used up so much time getting ready to enter that miners and firemen from Terre Haute and Brazil went in and brought out three of the four bodies.

Utilities Coal Consumption Drops Slightly In September; Power Output Gains

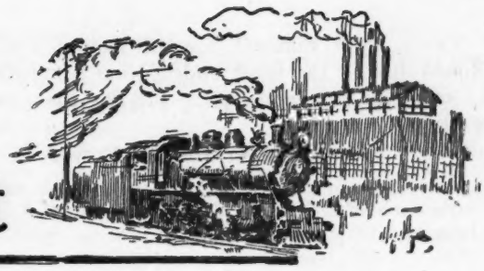
Electric public-utility plants consumed 3,182,075 net tons of coal during September, according to a report just issued by the U. S. Geological Survey. This compares with 3,211,124 tons consumed during August, according to corrected returns.

Fuel oil consumed by public-utility plants in September totaled 1,352,933 barrels, compared with 1,352,299 barrels in August. The average daily production of electricity by public-utility power plants during September was 152,400,000 kw.-hr., compared with 150,800,000 kw.-hr. in August.

Stockholders of the Philadelphia & Reading Coal & Iron Co., the stock of which is owned by the Reading Company, at a meeting held on Nov. 8, approved of the segregation plan in so far as it affects the coal company, including the creation of a new mortgage, under which bonds will be issued in exchange for the coal company's one-third proportion of the present general mortgage. The plan has been filed with and accepted by the U. S. District Court at Philadelphia.



Production and the Market



Weekly Review

The bituminous coal market, in regard to both production and prices, continues to drag along week after week with no change. Accounts in several newspapers on Monday of this week portraying the operators and union miners girding their loins for a big scrap next spring may have been inspired by the hope that the consumer could be scared into buying more coal. According to the estimate of the Geological Survey the consumer for the past twelve months has been buying more than he burns and there is nothing to indicate that he can be induced to increase his rate of purchase. Stocks of soft coal in the hands of industrial consumers and railroads are now well above the average for this time of the year. The bulk of the soft coal produced continues to move forward on contracts at prices $1 to $1.50 above the spot market.

Coal Age Index of spot prices of bituminous coal gained one point last week, reaching 184 on Nov. 12. This corresponds to the average weighted price of $2.23 per net ton at the mines. Anthracite prices are holding firm, independent quotations of around $12 at the mines being not uncommon for stove coal.

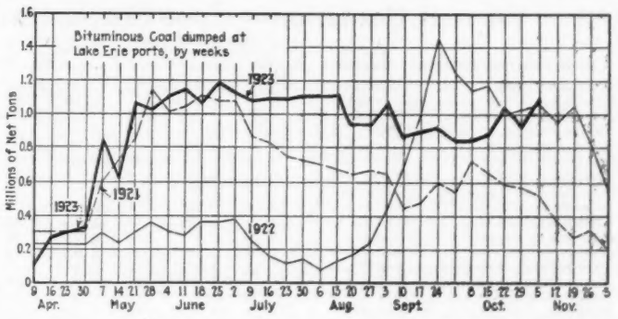
Output and Prices Unaffected by Shutdowns

Reports from all sections are to the effect that more and more mines are being closed. These mines in part are those of large companies, which are shutting high-cost operations and increasing the activity of their better mines. So far the number of mines shut down has not been sufficient to affect production or influence prices.

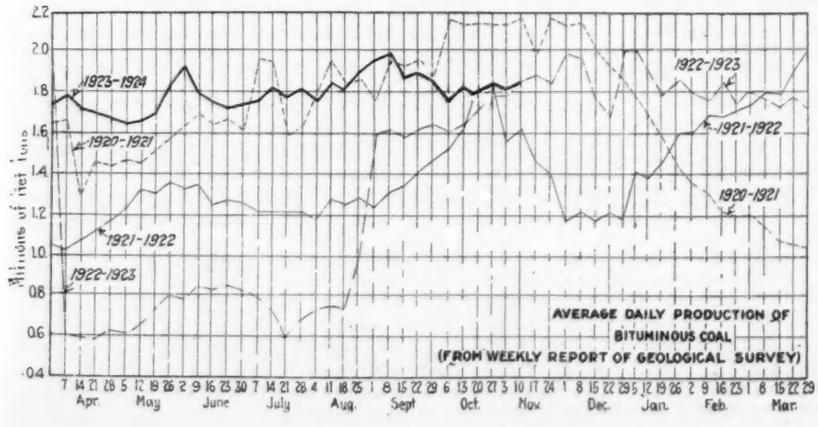
The resolution passed by the Smokeless operators, opposing wage reductions is expected to influence other non-union fields to take the same course. The Interstate Commerce Commission, by opening up the anthracite rate hearings to let in the West Virginia smokeless shippers is believed to have acted in conformity with the general policy of the administration, which is to encourage the use of substitutes for anthracite. These shippers would have an all-rail rate to Boston from southern West Virginia, or such improved dumping arrangements at Hampton Roads as will not break up their coal.

Shipments of smokeless coal to tidewater were temporarily checked by the strike on the Virginia Ry. last week, but there continues to be an abundance of coal available at Hampton Roads. New England is taking most of her industrial coal by water, which is assisting in keeping up the tidewater business. The Lake movement continues heavy and it is now expected that all records for bituminous coal movements over the lakes will be broken this year.

Demand for domestic sizes of anthracite is heavy. More Welsh anthracite is on the way to these shores and is expected to arrive during this month. Production of hard coal during the week ended Nov. 3 is estimated to have been 1,373,000 net tons, by the Geological Survey, a drop of 696,000 tons from the previous week.



	Week Ended Nov. 5	Season to Nov. 5
Cargo	1,044,495	26,535,176
Fuel	43,609	1,433,363
Totals	1,088,104	27,968,539



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Oct. 20	10,378,000	10,694,000
Oct. 27 (*a*)	10,683,000	10,919,000
Nov. 3 (*b*)	10,666,000	10,560,000
Daily average	1,778,000	1,811,000
Calendar year	322,588,000	467,300,000
Daily av. cal. year	1,237,000	1,795,000
ANTHRACITE		
Oct. 20	2,039,000	2,045,000
Oct. 27	1,836,000	2,069,000
Nov. 3	1,872,000	1,373,000
COKE		
Oct. 27	237,000	276,000
Nov. 3 (*a*)	213,000	269,000
Calendar year	5,804,000	15,929,000

(*a*) Subject to revision. (*b*) Revised from last report.

There were dumped for all purposes at Hampton Roads during the week ended Nov. 8 225,627 net tons of coal, as compared with 344,120 tons the previous week.

Midwest Market Lower

Nothing happened during the past week to relieve the market monotony of the Midwest. Almost all coals droned along at a little less than the pace of the week before, with lump and egg from Illinois and Indiana holding practically the whole domestic trade of the region against "foreign" coals, but with steam trade dragging screenings prices down a shade. Production has slowed down a little more to meet this situation, however, so that the small volume produced in Illinois and Indiana has kept domestic prices fairly stable.

Southern Illinois lump goes for the market price of $4@$4.35, Central Illinois lump for $3.25 and Indiana Fourth Vein for $3.25. A steady flow of anthracite into the Chicago region continues at the standard mine prices, but smokeless and other Eastern domestic coals are having a hard time West. West Virginia smokeless mine-run has dropped to $2@$2.50 and lump and egg is down a dollar to $5@$5.25 with only moderate demand for it at any price.

Southern Illinois Fields Inactive

There is little activity in the movement of anything from the southern Illinois field. Some mines are able to keep their lump moving, but are unable to move the other sizes. Several of them have no bills of all sizes. Railroad tonnage has slowed up during the last week, and there is general discouragement over the entire field. Independent mines seems to get the fast working time, while the Association operators still maintain their prices.

In the DuQuoin field conditions are bad. Some mines are idle altogether, as is the condition in the Carterville field, but prices are practically equal to those of the independent Carterville operators and it is hard to move anything. In the Mt. Olive district a little domestic tonnage is moving, but it is under pressure, and there is no place to put steam sizes. A car shortage prevents certain mines from working, while they have no bills on hand and, generally speaking, conditions in this field are bad. The Standard district is plugging along, selling coal in some instances

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern	Market Quoted	Nov. 13 1922	Oct. 29 1923	Nov. 5 1923	Nov. 12 1923†
Smokeless lump	Columbus	$6.85	$5.85	$5.85	*$5.00@$5.25*
Smokeless mine run	Columbus	6.25	2.30	2.30	**2.10@ 2.65**
Smokeless screenings	Columbus	5.85	1.35	1.35	1.25@ 1.50
Smokeless lump	Chicago	6.00	6.10	6.10	*5.00@ 5.25*
Smokeless mine run	Chicago	5.60	2.85	2.50	*2.00@ 2.50*
Smokeless lump	Cincinnati	6.00	5.85	5.75	*5.00@ 6.00*
Smokeless mine run	Cincinnati	6.10	2.50	2.10	**1.75@ 3.00**
Smokeless screenings	Cincinnati	6.25	1.50	1.60	*1.00@ 2.00*
*Smokeless mine run	Boston	7.10	4.40	4.40	*4.25@ 4.35*
Clearfield mine run	Boston	3.35	2.00	2.05	**1.70@ 2.60**
Cambria mine run	Boston	4.10	2.55	2.50	**2.25@ 3.00**
Somerset mine run	Boston	3.75	2.25	2.25	**2.00@ 2.75**
Pool 1 (Navy Standard)	New York	4.85	3.05	3.00	2.75@ 3.25
Pool 1 (Navy Standard)	Philadelphia	.....	3.10	3.05	*2.85@ 3.20*
Pool 1 (Navy Standard)	Baltimore	4.50	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	4.20	2.30	2.30	*2.00@ 2.50*
Pool 9 (Super. Low Vol.)	Philadelphia	4.30	2.35	2.30	*2.15@ 2.45*
Pool 9 (Super. Low Vol.)	Baltimore	4.10	2.15	2.15	*2.00@ 2.15*
Pool 10 (H.Gr.Low Vol.)	New York	3.50	2.05	2.00	1.75@ 2.25
Pool 10 (H.Gr.Low Vol.)	Philadelphia	3.50	1.90	1.85	1.75@ 2.00
Pool 10 (H.Gr.Low Vol.)	Baltimore	3.35	2.10	2.10	*1.85@ 2.00*
Pool 11 (Low Vol.)	New York	3.00	1.75	1.65	**1.50@ 2.00**
Pool 11 (Low Vol.)	Philadelphia	3.15	1.60	1.55	**1.55@ 1.70**
Pool 11 (Low Vol.)	Baltimore	3.05	1.90	1.90	*1.70@ 1.85*
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	3.45	1.60	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.)	Philadelphia	3.50	1.60	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.)	Baltimore	3.30	1.75	1.75	*1.70*
Pittsburgh sc'd gas	Pittsburgh	4.50	2.55	2.55	2.50@ 2.60
Pittsburgh gas mine run	Pittsburgh	.....	2.25	2.25	2.20@ 2.30
Pittsburgh mine run (St.)	Pittsburgh	3.35	1.90	1.90	1.85@ 2.00
Pittsburgh slack (Gas)	Pittsburgh	3.60	1.05	1.05	1.00@ 1.15
Kanawha lump	Columbus	5.85	3.15	3.00	2.85@ 3.15
Kanawha mine run	Columbus	4.25	1.85	1.85	1.75@ 2.00
Kanawha screenings	Columbus	3.60	.90	.80	*.60@ .75*
W. Va. lump	Cincinnati	6.10	3.35	3.25	*2.75@ 3.50*
W. Va. Gas mine run	Cincinnati	4.25	1.50	1.50	1.25@ 1.75
W. Va. Steam mine run	Cincinnati	3.75	1.50	1.50	1.25@ 1.75
W. Va. screenings	Cincinnati	3.75	.75	.85	*.60@ 1.00*
Hocking lump	Columbus	5.50	3.06	2.95	*2.85@ 3.00*
Hocking mine run	Columbus	3.50	1.85	1.85	1.75@ 2.00
Hocking screenings	Columbus	3.00	.85	.80	*.60@ .80*
Pitts. No. 8 lump	Cleveland	3.81	2.55	2.55	2.10@ 3.00
Pitts. No. 8 mine run	Cleveland	3.56	1.85	1.85	**1.85@ 1.95**
Pitts. No. 8 screenings	Cleveland	3.31	.90	.85	**.90@ 1.10**

Midwest	Market Quoted	Nov. 13 1922	Oct. 29 1923	Nov. 5 1923	Nov. 12 1923†
Franklin, Ill. lump	Chicago	$5.35	$4.10	$4.10	$3.90@$4.35
Franklin, Il. mine run	Chicago	4.10	2.55	2.60	2.25@ 3.00
Franklin, Ill. screenings	Chicago	2.60	1.45	1.45	1.40@ 1.50
Central, Ill. lump	Chicago	4.70	3.10	3.10	3.00@ 3.25
Central, Ill. mine run	Chicago	3.10	2.10	2.10	2.00@ 2.25
Central, Ill. screenings	Chicago	1.85	1.05	1.05	.90@ 1.20
Ind. 4th Vein lump	Chicago	5.10	3.35	3.35	3.25@ 3.50
Ind. 4th Vein mine run	Chicago	3.85	2.60	2.60	2.50@ 2.75
Ind. 4th Vein screenings	Chicago	2.05	1.20	1.20	1.15@ 1.30
Ind. 5th Vein lump	Chicago	4.75	2.50	2.50	2.25@ 2.75
Ind. 5th Vein mine run	Chicago	3.60	2.10	2.10	2.00@ 2.25
Ind. 5th Vein screenings	Chicago	1.85	.80	.80	.75@ .90
Mt. Olive lump	St. Louis	.....	3.10	3.10	3.00@ 3.25
Mt. Olive mine run	St. Louis	.....	2.25	2.25	2.20@ 2.30
Mt.Olive screenings	St. Louis	.....	1.25	1.00	1.00
Standard lump	St. Louis	4.25	3.05	3.05	2.90@ 3.25
Standard mine run	St. Louis	2.50	2.05	2.05	1.80@ 2.30
Standard screenings	St. Louis	1.30	.45	.55	.50@ .60
West Ky. lump	Louisville	4.75	2.40	2.60	**2.75@ 3.25**
West Ky. mine run	Louisville	2.55	1.65	1.65	1.50@ 1.85
West Ky. screenings	Louisville	1.75	.50	.65	*.50@ .70*
West Ky. lump	Chicago	4.10	2.60	2.60	**2.75@ 3.00**
West Ky. mine run	Chicago	3.10	1.75	1.75	1.50@ 2.00
South and Southwest					
Big Seam lump	Birmingham	3.95	3.75	3.85	3.75@ 4.00
Big Seam mine run	Birmingham	2.35	1.95	1.95	1.75@ 2.15
Big Seam (washed)	Birmingham	2.60	2.35	2.35	2.25@ 2.50
S. E. Ky. lump	Chicago	5.50	3.00	3.00	**3.00@ 3.50**
S. E. Ky. mine run	Chicago	4.25	2.25	2.25	2.00@ 2.50
S. E. Ky. lump	Louisville	6.60	3.00	3.00	**3.25@ 3.75**
S. E. Ky. mine run	Louisville	4.25	1.75	1.85	1.50@ 2.25
S. E. Ky. screenings	Louisville	4.00	.75	.75	.65@ .85
S. E. Ky. lump	Cincinnati	6.25	3.35	3.35	*2.50@ 3.50*
S. E. Ky. mine run	Cincinnati	3.85	1.50	1.50	1.25@ 1.75
S. E. Ky. screenings	Cincinnati	3.60	.75	.85	.50@ 1.25
Kansas lump	Kansas City	5.75	5.00	5.00	**5.00@ 5.25**
Kansas mine run	Kansas City	3.75	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.25	2.25	2.25

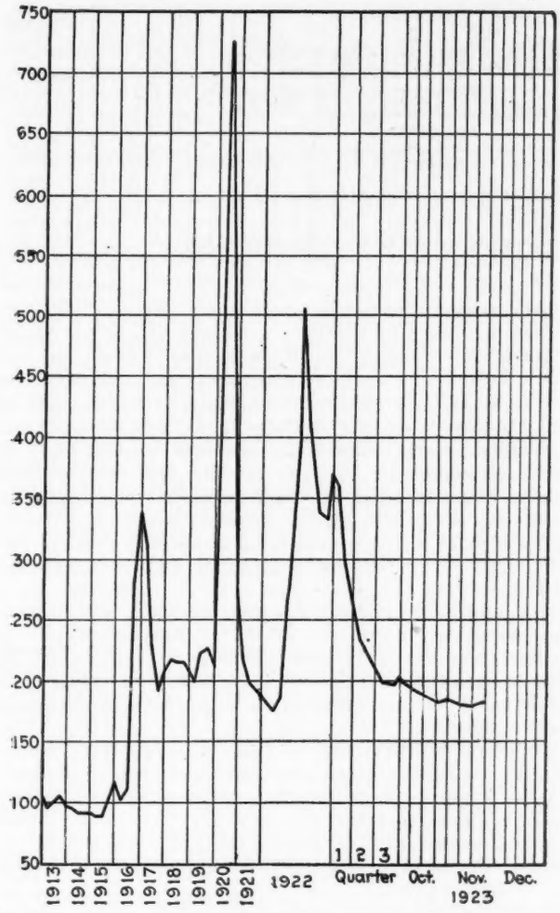
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Dec. 26, 1922 Independent	Dec. 26, 1922 Company	Nov. 5, 1923 Independent	Nov. 5, 1923 Company	Nov. 12, 1923† Independent	Nov. 12, 1923† Company
Broken	New York	$2.34	$9.00	$7.75@$8.25	$9.60@10.50	$8.00@$9.25	$9.60@10.50	$8.00@$9.25
Broken	Philadelphia	2.39	.....	7.90@ 8.10	.....	.....	.....	.....
Egg	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Egg	Philadelphia	2.39	9.25@11.00	8.10@ 8.35	9.85@12.20	8.75@ 9.25	9.85@12.20	8.75@ 9.25
Egg	Chicago*	5.06	12.50@13.00	7.20@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Stove	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Stove	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Stove	Chicago*	5.06	12.50@13.00	7.35@ 8.25	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Chestnut	New York	2.34	9.25@12.00	8.00@ 8.35	9.85@12.25	8.75@ 9.25	9.85@12.25	8.75@ 9.25
Chestnut	Philadelphia	2.39	9.25@11.00	8.15@ 8.35	9.85@12.20	8.90@ 9.25	9.85@12.20	8.90@ 9.25
Chestnut	Chicago*	5.06	12.50@13.00	7.35@ 8.35	9.60@12.50	8.00@ 8.35	9.60@12.50	8.00@ 8.35
Ranges	New York	2.34	.....	8.25	.....	9.00	.....	9.00
Pea	New York	2.22	7.00@11.00	6.15@ 6.30	6.75@ 8.25	6.15@ 6.65	6.75@ 8.25	6.15@ 6.65
Pea	Philadelphia	2.14	7.00@ 8.00	6.15@ 6.20	6.75@ 9.00	6.35@ 6.60	6.75@ 9.00	6.35@ 6.60
Pea	Chicago*	4.79	7.00@ 8.00	5.49@ 6.03	6.00@ 6.75	5.40@ 6.05	6.00@ 6.75	5.40@ 6.05
Buckwheat No. 1	New York	2.22	4.00@ 5.00	4.00@ 4.10	2.00@ 3.00	3.50	2.00@ 3.00	3.50
Buckwheat No. 1	Philadelphia	2.14	5.00	3.00@ 4.00	3.00@ 3.50	3.50	*2.25@ 3.50*	3.50
Rice	New York	2.22	3.00@ 3.25	2.75@ 3.00	1.50@ 2.15	2.50	*1.50@ 2.00*	2.50
Rice	Philadelphia	2.14	2.50@ 2.75	2.75@ 3.00	2.00@ 2.50	2.50	*1.75@ 2.50*	2.50
Barley	New York	2.22	1.75@ 2.00	1.50@ 2.00	1.00@ 1.50	1.50	*1.00@ 1.25*	1.50
Barley	Philadelphia	2.14	1.00@ 1.75	2.00	1.25@ 1.50	1.50	*1.00@ 1.50*	1.50
Birdseye	New York	2.22	.....	2.10	.....	1.60	1.45	1.60

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index of Spot Prices Bituminous Coal F.O.B. Mines

	1923			1922
	Nov. 12	Nov. 5	Oct. 29	Nov. 13
Index	184	183	184	340
Weighted average price	$2.23	$2.21	$2.23	$4.12

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally, shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

below cost. Steam is the hardest size to move but even 6-in. lump, which moves the easiest, is frequently noted among the no-bills.

St. Louis Trade Still Quiet

Mild weather continues to maintain a soft market in St. Louis. The general condition is discouraging. Many oil burners have cut into the demand for better grade coals. The little tonnage that is moving is of the middle and lower grades and while there has been some movement the past week, it is in small quantities. Anthracite trading is light in comparison with past years. Coke and smokeless are not factors. Country domestic business is slow and calls for cheaper grades only. Country steam is hard to find, although a little movement of steam egg and nut has been noted to Omaha, Minneapolis and Chicago. Wagonload steam seems to maintain its own, but everything is far below normal.

Kentucky Market Unsettled

Although lower markets on prepared coal had been anticipated over the week as a result of cessation of Lake shipping, cool weather has created a better demand for prepared sizes from retailers, while potteries have been operating at capacity, and general consumption has been fair, with the result that prices are holding, and in fact are a shade stiffer in western Kentucky, where there is an effort to advance lump from $3 to $3.25. Steam prices continue low, and with production of prepared at its present level there is not much prospect for a good price for steam coal or screenings at this time.

The general market shows little change over levels in effect over the past two or three weeks. Railroad reports show full car supply on all western Kentucky divisions, and eastern Kentucky is not complaining.

No general reductions in wage scales in eastern Kentucky are expected before April 1, but a few scattered operations are now on the 1917 wage scale, and are producing some cheap coal that will be a mean factor in competitive selling, and which may force numerous other reductions. Most of the reductions in eastern Kentucky and Tennessee have been in small mines.

Northwest Trade Is Moderate

Coal trading continues fair throughout the Northwest but without excitement except a little that is stirring up over a possible slight shortage of anthracite in the northward regions. Hard-coal receipts at Duluth-Superior have not been as heavy as expected for the past three weeks and it now appears the country trade has bought up about all there is on docks. In spite of high prices, this is stimulating the hard-coal market.

Anthracite shipments have been made to the Dakotas, western Minnesota and some points in Canada from Duluth and more orders have been accepted and will leave the docks before the closing of navigation. The Duluth market is fairly well depleted and two docks have stopped local sales of stove and nut. Most of the docks are not taking orders for car lot shipments of anthracite from outside points.

Receipts at Duluth-Superior up to Oct. 31 are as follows: Hard, 1,179,779 tons; soft, 9,691,680 tons; total, 10,871,459 tons. The increase as compared with last year's shipments to the same date are: Anthracite, 925,280 tons; soft, 6,187,492 tons. The average receipts to Oct. 31 over six years is 7,924,492. In all, twenty-four cargoes of hard and 168 cargoes of soft coal have arrived.

The Milwaukee coal market is quiet. Jobbers and retailers report little doing and a minimum amount of fuel is being consumed. Coke and the domestic grades of soft coal are the best sellers since anthracite has been lifted to the luxury class. Coal is coming freely by lake. The average receipts during the first five days of November were 40,312 tons per day. November receipts thus far aggregate 37,300 tons of anthracite and 205,156 tons of soft coal, making the season's receipts to date 821,624 tons and 2,802,857 tons, respectively. The dock yards are nearly filled to capacity with soft coal. Prices remain unchanged.

Western Trade

There was little life in coal trade throughout the West and Southwest during the week beyond the fact that steam trade began picking up in and around Kansas City, and Kansas lump, after a long period of slow running time at the mines, was able to raise its top price from $5 to $5.25. There are fewer no-bills in the Kansas and Oklahoma fields just now. Most mines get about 50 per cent of full time.

In Colorado there is a slight stimulation of domestic trade by reason of cool weather and the demand for steam coal has come up slightly also, but the whole effect has been small on production and running time. In Utah trade is quieter than it has been for weeks. The last vestige of car shortage which afflicted a few operations a little a couple of weeks ago has passed and now there is no need for many of the cars available. Running time averages little over two days a week. Stocks of all sorts of coal are rolling up.

Ohio Buyers Limiting Purchases

Buying of both domestic and steam coals is limited to immediate wants in the Columbus market and there is little disposition to buy for the future. On the whole the trade is quiet. Retail stocks of domestic coals are fairly good, and while this trade probably is the best feature of the market, it is not as active as a few months back. West Virginia

splints and Pocahontas are in best demand for domestic use and there also is a fair demand for Pomeroy, Crooksville and Cambridge grades. The steam trade at Columbus is quiet, as reserves are heavy.

In the Cincinnati market cool weather failed to arouse the market materially. Domestic coals move slowly and slack is hard to place at almost any price. Consignment and distress coals, which were so prominent in this market a few weeks ago, have been pretty well cleaned up. The under-current in the low-volatile market seems to be the point of interest now. There are reports that large tonnages are being moved at $5 or less, but these sales are not being acknowledged by the companies. Quotations for West Virginia and southeastern Kentucky 2-in. lump range from $2 to $2.50.

Reports from the Cleveland market are pessimistic. Industrials are not inclined to add to their already heavy reserve stocks and inquiries are not numerous. The retail dealer is not reporting the usual activity.

Very little distress coal is to be had in the Pittsburgh market, and the coal now being offered at low prices, below what operators claim is the real cost, is nearly all fresh-mined product. Production in the Pittsburgh district continues to decrease, as one mine after another closes on account of having completed its lake shipments. It was expected that the closing of mines would improve market conditions, but as the market has not stiffened it is assumed that other mines have not completed their lake deliveries and are still offering coal in the spot market.

There are few signs of improvement in central Pennsylvania. Producers say there is no business to be had and the mines are working two or three days a week, while many of the smaller operations are closed down.

New England Quotations Lower

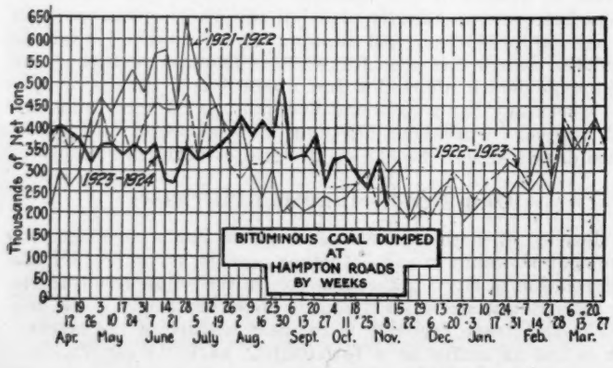
In New England quotations for spot coal are even lower than a week ago. Aside from distress coal, No. 1 Navy standard Pocahontas and New River are rumored to have been sold within a few days at less than $4.25 f.o.b. vessel, Hampton Roads. On cars Boston there have also been sales at correspondingly low figures. On mine run, $5.18 and $5 have been named, and slack has been disposed of at more than 50c. less. It should be said, however, that receipts are running less than they were, and judging from the number of operations that have closed down the past week it is expected the latter half of the month would make November totals very much less than figures for October.

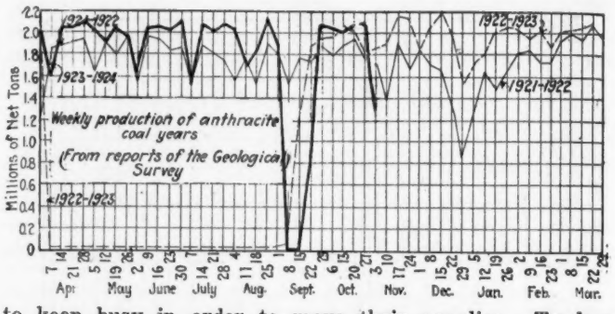
On all-rail from Central Pennsylvania there is almost nothing doing in this territory. A few scattering sales are made in areas west of the Connecticut River, but from there east there is practically no outlet for anything but tidewater coal.

Reserves are heavy, and it will be interesting to watch the course of the market during the next few weeks. There are some who think there will be no pronounced turn for the better until January, when possible labor complications may begin to loom up.

Less Coal at New York Tidewater

Slowing up of shipments to the New York tidewater resulted in a partial cleaning up of loaded boats and distress coal. Demand did not improve, however, and shippers had


1921-1922
1922-1923
1923-1924
BITUMINOUS COAL DUMPED AT HAMPTON ROADS BY WEEKS
Thousands of Net Tons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar.



to keep busy in order to move their supplies. Tenders received last week by the U. S. Shipping Board for delivering alongside vessels, New York harbor, 2,000 gross tons Pool 9 bituminous coal, resulted in prices ranging from $4.21 to $5.47, as compared with $4.18 to $5.25 submitted about ten days previously. There is no improvement in the Philadelphia market and some interests believe there has been a shrinkage in business moving for the last three weeks. The consumer is indifferent. Several important jobbers at Baltimore report getting inquiring involving large tonnages and it is said some important closings were made. One of the disturbing elements has been reports of bad preparation.

More mines are closing down in northern and southern West Virginia. Demand continues slow, although cool weather created a little better call for screened coals and stiffened the price slightly, but the increase was not general. No-market losses are reported as large in the southwestern Virginia fields.

Conditions at Birmingham are not promising. Inquiry and new business is confined to spot sales. Sales of domestic grades are fairly good, while production is being closely confined to trade requirements. There has been a marked decrease in iron production and consequently less demand for furnace coke, while the market for foundry coke is quiet and easy.

Welsh Anthracite for New England

The situation in New England with regard to anthracite is in a fair way to be relieved slightly by the arrival of about 30,000 tons of Welsh anthracite, which will be brought to these shores this month and landed at Boston, Providence and Portland. Some of this tonnage is now on the way. Activity continues to be confined to the domestic sizes. Demand is active and retail dealers desire larger shipments. Egg and pea coals are the easiest in supply, but there is no surplus of either size.

Stove and chestnut sizes are most in demand in New York and Philadelphia, and retail dealers say they are not receiving enough of these coals to take care of their trade. Dealers at Baltimore are disappointed over the lack of shipments but are able to take care of emergency orders. However, while there is a considerable tonnage of unfilled orders on the books, practically all consumers have been given some coal. Demand for anthracite at Buffalo far exceeds the demand, but shippers there are not disturbed over the situation, for they believe there is going to be coal enough to go around.

The steam sizes move slowly. Considerable storing is being done by both the larger producers and some independents. In many instances retail dealers are taking car for car of the smaller coals in order to get the domestic sizes, and in some cases are able to get the larger coals at lower prices but are quoted slightly higher prices for the smaller coals.

Car Loadings, Surplusages and Shortages

	Cars Loaded	
	All Cars	Coal Cars
Week ended Oct. 27, 1923	1,073,965	195,535
Previous week	1,072,881	190,451
Same week in 1922	999,718	193,809

	Surplus Cars		Car Shortages	
	All Cars	Coal Cars		
Oct. 31, 1923	24,477	7,205	12,336	3,068
Same date in 1922	3,716	1,584	.....	.....
Oct. 22, 1923	23,895	5,674	13,655	3,250

Foreign Market And Export News

British Coal Consumers Close Contracts; Output Declines Slightly

There was a decrease of 5,000 tons in the production of coal in Great Britain's mines during the week ended Oct. 27, as compared with the previous week's output, says a cable to *Coal Age*. The output was reported as 5,675,000 tons as against 5,680,000 tons the previous week, while the production for the corresponding week of 1922 was 5,388,000 tons.

Though the Welsh coal market has not improved materially it is understood that a number of large consumers have contracted for coal for the early part of next year. The tonnage involved was not announced but it is understood to aggregate about 500,000 tons and that the prices accepted range from 6d. to 1s. over last year's contract figures.

Several small orders have been placed for Admiralty large steam, at a slight advance in price, but as operating and labor costs have also increased the benefit of the advance is not felt.

One company has sold between 100,000 and 150,000 tons of machine-broken anthracite cobbles and nuts to America and Canada. It is understood that this same company has arranged for the installation of breaking plants at New York, Montreal and Quebec.

Welsh operators are expecting the French, Italian and German demands to increase during the winter months.

The Newcastle market is still in a strong position and no anxiety is felt over business during November. Various contracts are reported for lots of 10,000 to 20,000 tons for delivery over next year, and 30,000 best steams at 24s. 6d. per ton for January-February delivery. Tenders have been cabled for 25,000 tons of steam coal for the Norwegian State Railways.

Hampton Roads Dumpings Decrease

Business at Hampton Roads did not improve last week, while dumpings for the week ended Nov. 8 amounted to 225,627 net tons, a decrease of 118,493 tons when compared with the previous week. Coastwise trade and bunkers constituted the bulk of the business, with the former showing signs of increasing.

The strike of the Virginian railway engineers caused a complete tie up at the piers of that road at Sewalls Point, with a consequent strengthening in the coal market, but which was regarded as temporary. The effect of the strike was not felt as it would have been at any other time of the year, because the demand for coal was not brisk.

There is less stringency in the domestic coal business than has existed at this period for the last two years, because consumers appear to be content to confine themselves largely to soft coal, of which there is an abundant supply. The tone of the market was somewhat stronger than for the previous two weeks.

"Popular" Coals for French Consumers

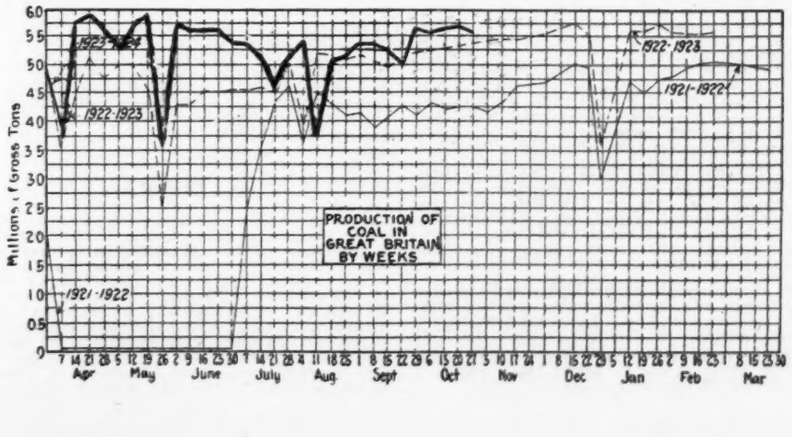
To combat the high cost of living the French authorities have asked retail dealers to make a special selection of coals to be sold as "popular" coals at reasonable prices. Due to mild weather demand for house coals is weak, otherwise the present supplies would soon be exhausted. Industrials coals are in fair demand.

Wage negotiations looking to a readjustment of miners' pay are now under way and it is generally believed that the workmen will secure some concessions.

Imports of British coal show a slight increase, but consumers are not inclined to make heavy purchases due to the condition of the money market.

France and Luxemburg received about 30,000 tons of indemnity coal during the period Oct. 11-20, 61,100 tons of coke and 4,900 tons of lignite, a total of 96,000 tons, as compared with 109,200 tons for the previous ten days. The Minister of Public Works who recently returned from an inspection of the Ruhr district, reports that actual daily shipments must not be expected to average more than 7,000 tons of coal and 3,000 tons of coke.

Imports of coal during September amounted to 2,619,831 tons as compared with 2,241,157 tons in August. This included 1,667,185 tons from Great Britain and 41,768 tons from the United States. Exports during the same period was 171,853 tons, as compared with 185,725 tons in August. Coke imports amounted to 280,116 tons in September as against 274,606 tons in August, with exports of 49,944 tons in September as compared with 59,976 tons in August. Imports of patent fuel in September amounted to 46,374 tons and exports of 19,536 tons. In August the imports were 64,460 tons and exports 12,545 tons.



Export Clearances, Week Ended Nov. 10, 1923

FROM BALTIMORE

	Tons
For France:	
Belg. SS. Eglantier	6,523
For Canada:	
Nor. SS. Otto Sverdrup	5,741
For Porto Rico:	
Am. SS. Major Wheeler	348
For Cuba:	
Br. SS. Berwindvale	8,333
Am. Schr. Charles D. Stanford	1,112

FROM HAMPTON ROADS

For New Brunswick:	
Nor. SS. Songa, for St. John	4,304
Dan SS. Dorte, for Chatham	3,304
For Bermuda:	
Amer. Schr. Margaret Spencer, for Hamilton	991
For Cuba:	
Nor. SS. Runa, for Preston	1,430
Nor. SS. Gefion, for Cayo Mambi	603
Amer. Schr. Friendship, for Manzanillo	892
Br. SS. Berwindmoor, for Havana	9,410
For Italy:	
Ital. SS. Maria Enrica, for Porto Ferrajo	10,840
For Halifax:	
Amer. Schr. Lydia McClellan, Baxter.	1,758
For Egypt:	
Br. SS. Langton Hall, for Port Said	2,533

Hampton Roads Pier Situation

	Nov. 1	Nov. 8
N. & W. piers, Lamberts Pt.:		
Cars on hand	1,899	2,297
Tons on hand	114,718	143,943
Tons dumped for week	101,618	86,761
Tonnage waiting	.....	7,500
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,684	1,739
Tons on hand	99,400	104,850
Tons dumped for week	97,702	79,971
Tonnage waiting	7,100	7,332
C. & O. piers, Newport News:		
Cars on hand	972	1,437
Tons on hand	51,750	73,970
Tons dumped for week	107,931	34,721
Tonnage waiting	1,525	.....

Pier and Bunker Prices, Gross Tons

PIERS

	Nov. 3	Nov. 10†
Pool 9, New York	$4.65@$5.00	$4.65@$5.00
Pool 10, New York	4.00@ 4.75	*4.10@ 4.50*
Pool 11, New York	3.90@ 4.25	**4.00@ 4.25**
Pool 9, Philadelphia	5.20@ 5.35	*5.00@ 5.20*
Pool 10, Philadelphia	4.30@ 4.85	*4.00@ 4.70*
Pool 11, Philadelphia	4.05@ 4.40	*3.95@ 4.15*
Pool 1, Hamp. Roads	4.20@ 4.40	**4.25@ 4.50**
Pools 5-6-7 Hamp. Rds.	4.15@ 4.25	*4.00*
Pool 2, Hamp. Roads	3.85@ 4.00	*3.75@ 4.00*

BUNKERS

Pool 9, New York	4.95@ 5.30	4.95@ 5.30
Pool 10, New York	4.30@ 5.05	*4.40@ 4.85*
Pool 11, New York	4.20@ 4.55	**4.30@ 4.55**
Pool 9, Philadelphia	5.35@ 5.75	*5.20@ 5.55*
Pool 10, Philadelphia	4.80@ 5.10	*4.60@ 5.00*
Pool 11, Philadelphia	4.35@ 4.65	*4.25@ 4.50*
Pool 1, Hamp. Roads	4.20@ 4.40	**4.25@ 4.50**
Pool 2, Hamp. Roads	3.85@ 4.00	*3.75@ 4.00*

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to *Coal Age*

	Nov. 3	Nov. 10†
Admiralty, large	27s.@27s.6d.	**27s.6d.@28s.**
Steam smalls	15s.6d.@17s.6d.	.....
Newcastle:		
Best steams	25s.	**25s.6d.@26s.**
Best gas	24s.	24s.
Best bunkers	23s.@24s.	*22s.6d.@24s.*

† Advances over previous week shown in heavy type, declines in *italics*.

News Items From Field and Trade

ALABAMA

George Gordon Crawford, president of the Tennessee Coal, Iron & Railroad Co., has accepted the chairmanship of the State harbor board, created by an act of the recent Legislature to supervise the development of port and harbor facilities at Mobile, for which the state will lend its credit to the extent of $10,000,000.

The Pratt Fuel Corporation has purchased the mineral lands and plants of the Bryan Coal Corporation, consisting of about 10,290 acres of valuable coal lands in Jefferson and Walker counties and a number of producing mines. The consideration is said to have been between $600,000 to $700,000. The acquisition of the new properties will give the Pratt Corporation a potential capacity of about 1,000,000 tons of coal annually. Walter Moore is president of the Pratt Corporation and also is vice president of the DeBardeleben Coal Corporation, formed several months ago by the merger of three independent commercial producing companies.

William Dockerty, foreman of No. 1 Pratt mine of the Tennessee Coal, Iron & Railroad Co., was **fatally injured** Oct. 27 when struck by a tram car in the mine. Mr. Dockerty had been identified with mining operations in the Birmingham district for many years and was widely known.

The annual meeting of the Alabama Mining Institute will be held Nov. 21 at the Roebuck Country Club. Officials will make report on activities of the Institute during the past year and officers and committees for the new year will be elected. The meeting will be addressed by Harry L. Gandy, of Washington, executive secretary of the National Coal Association, and possibly by President Brydon, the latter having been invited to be present.

ARKANSAS

Fire destroyed the tipple of the Mine No. 1 of the Southern Anthracite Coal Co. at Russellville, Oct. 16, causing a loss of approximately $100,000.

Work will be started at once, it is understood, on the **rebuilding of the tipple and top works at the Bernice mine No. 1** of the Southern Anthracite Coal Co. which were recently destroyed by fire near Spadra, with a loss of $100,000.

COLORADO

Fred Ewing recently with the National Fuel Co. of Denver is now associated with the Ewing Fuel Co. which includes Mr. Ross and Mr. Campbell. This company is in the brokerage of coal, handling Ross Coal Co., anthracite from Crested Butte.

The Midwest mine located at Palisades, recently closed on account of explosion in which six men lost their lives, **has reopened** and is operated by the sons of R. T. Scott who formerly had the lease before the explosion.

ILLINOIS

The United States Steel Corporation has transferred to the Burton Coal Co. of Chicago its 3,000 acre tract of virgin coal land in Williamson County. This property, which has been held by the steel interests as a reserve for the future, will be operated soon by the Burton Company, through the Freeman shaft of that company on land adjoining. It is improbable that a new shaft will be driven.

The Nason Coal Co., Chicago, announces the appointment of **John D. Ristine as assistant to the vice-president,** effective Nov. 15.

The Southern Coal Co., 343 S. Dearborn Street, Chicago, has been granted a charter of incorporation by the Secretary of State at Springfield. Capital stock is given as $50,000. The company will mine, buy and sell coal, coke, etc. Incorporators are: William G. Worthey, Louis C. Horner and Joseph B. Lawler.

INDIANA

Reductions in the price of domestic bituminous coal and coke ranging from 50c. to $1.50 a ton have been announced by the Indianapolis coal dealers. This is the first time in 25 years that fall coal is cheaper than spring coal in Indiana. Pocahontas shoveled lump was reduced from $11.50 a ton to $10.50. Pocahontas mine run from $9 to $7.50 a ton. West Virginia lump from $9 to $7.75 and Kentucky lump from $9 to $8. Coke dropped from $12.25 to $11.75 a ton, and crushed coke from $12.25 to $11.75. Linton Fourth Vein forked lump was reduced from $6.75 to $6.25, and Linton Fourth Vein shoveled lump from $5.50 to $4.95 a ton.

After being entombed in the Hunt Brothers' Mine at Staunton for more than seven hours Oct. 27 the **lifeless bodies of three miners and a boy were taken from the fire-wrecked mine.** The bodies were removed by volunteer workers after an all-day fight to subdue the flames, which wrecked the interior of the mine following the explosion of a gasoline engine in the workings of the mine. The four victims of the explosion were: John Landis, 44, of near Eagles; Peter Butterman, 45, Brazil; Joe Hardy, 65, Turner, Ind., and George Harvey, 10-year-old son of Joe Hardy, who was spending the day in the mine with his father. Four other men were rescued shortly after the explosion, when a rope was let down the air shaft and they climbed to safety.

The Burnett Mutual Mining Co., of Burnett, has been incorporated with a capital of $50,000 to mine coal. The directors of the company are Walter Foxworthy, J. L. Revonald, Ed Hoffman, Noble Christopher, Elmer Marquis and Fred Christopher.

KENTUCKY

Underground coal-loading machines are coming into greater use in western Kentucky and several companies which haven't them have heard good reports concerning their operation, and are planning to install. Western Kentucky, a section of thick coal, can use loaders to advantage. While it is a union field, the union workers, although plainly showing that they do not care for labor-saving machinery, have used the machines and have not been directly hostile to the idea. Eastern Kentucky, a field largely non-union, contains a good many thin-seam mines, and it is contended that the coal-loading machine cannot be operated as well there. However, it is believed that eastern Kentucky in a number of instances will come around to loaders.

Amended articles have been filed by the Wallins Creek Coal Co., Louisville, operating in Southeastern Kentucky, the capital being placed at $150,000 and debt limit at $500,000. T. L. Young, L. H. Young and J. L. Laurent are the incorporators.

Western Kentucky is feeling rather good as a result of a decision of the Interstate Commerce Commission placing the freight rate from western Kentucky to the Northwest on the basis of 25c. a ton over the rate from the southern Illinois mine group. The Western Kentucky Coal Bureau had been fighting for this rate for a year or more. The new rates go into effect Jan. 24, 1924.

It is reported that J. D. Wheeler, of Pike County, is one of the organizers of the **Barking Coal Co.,** a $100,000 company, which will install a new operation in Dickinson County, Va., on the Carolina, Clinchfield & Ohio R.R., a few miles from the Kentucky border.

J. H. Sudworth, of Central City, has been appointed an assistant state mine inspector, to succeed J. A. Lewis, in the third state district.

There is no movement of river coal now, as the Ohio River is lower than within a period of 40 years or more.

MISSOURI

Missouri coal is becoming an important fuel source to industries within the state. There is an apparent notable increase in mining over the strike year of 1922. Coal lands are acquiring increased values. Public-utility plants in the state are not only using more Missouri coal than in the past, some of them have purchased and are operating their own mines, while others are seeking mines, according to the Missouri Committee on Public Utility Information. An electric light and power company is operating its own mines at Clinton. Another company has acquired mining rights to 60,000 acres of coal land near Salisbury. Coal mining at Novinger, Kirksville, Bevier, Lexington, Richmond, Moberly and Fulton has been greatly stimulated by the demand of public-utility plants for fuel, the committee states.

W. G. O'Fallon, fuel agent for the St. Louis Terminal R.R. Association for fifteen years, has resigned to engage in private business. During the strike in 1922 he was one of the four experts appointed by the American Railway Association to allocate railroad fuel when the situation was worst. His territory was the southwestern region.

C. B. Bee, chief rate expert for the Public Service Commission of Missouri, **has resigned** to accept a similar position with the Oklahoma commission, effective Nov. 1. He leaves for an increase of $1,500 a year. The Missouri salary was $4,200. **He will be succeeded by V. E. Smart,** traffic expert of the Board of Railway Commissioners of North Dakota.

NEW YORK

Charles S. Allen, who was secretary of the Wholesale Coal Association of New York and is now connected with the Cory Mann George Corporation, of New York and London, has been **appointed manager of the office of the corporation recently opened in Scranton, Pa.**

Robert L. Kyte, formerly with Bulah Coal Mining Co., **has become associated with Fred D. Gearhart, Inc.,** of New York City, as combustion engineer.

M. A. Hanna Co. for the quarter ended Sept. 30, **reports total net income of $679,936** after interest, depreciation, depletion and federal taxes, equivalent, after allowing for preferred dividend requirements, to $1.47 a share earned on the outstanding 282,844 shares of no par common stock. For the nine months ended Sept. 30, total net income was $1,938,137, equivalent, after allowing for preferred dividends, to $4.82 a share on common.

Colorado Fuel & Iron Co. for the quarter ended Sept. 30, 1923, **reports a deficit of $316,644** after fixed charges and depreciation, compared with a deficit of $131,462 in the corresponding quarter of 1922. Gross receipts amounted to $7,762,931, compared with $7,266,964 in the 1922 period, while operating expenses aggregated $7,096,421, against $6,376,400. Non-operating income was $105 365, compared with $73,391 in the third quarter of 1922. Fixed charges, etc., were $712,448 against $719 407 and depreciation charges were $382,671, compared with $376,011 in the 1922 period.

Chas. A. Owen, Howard Adams, and James E. Manter, Receivers of the Tidewater Coal Exchange, Inc., announce that J. O. Wolcott, Chancellor of the State of Delaware issued on Oct. 26 the following order in connection with the dissolution of the Tidewater Coal Exchange, Inc.: "It is hereby ordered that the **time for filing claims** against the said receivership estate be and the same is hereby **renewed and extended until the 1st day of January, A.D., 1924,** and the time for receivers and all other persons in interest to file exceptions to claims filed against said estate be and the same is hereby extended until the 1st day of April, A.D., 1924." Probated claims, the receivers say should be filed with the Register in Chancery, Wilmington, on or before Jan. 1, 1924.

OKLAHOMA

The Oklahoma School of Mines has established **a branch school in Henryetta, to instruct miners in different phases of mine work.** The school opened with 60 men enrolled. Under the direction of W. E. Howard, it will have three additional instructors. Classes will be held in the afternoon and evenings. The school is supported by an appropriation of both state and federal funds, and is open to any person more than 16 years old who is not a pupil in the city schools.

OHIO

The Tildesley Coal Co., of Cincinnati, has purchased the P M C mines at Sprigg, W. Va., on the Norfolk & Western Ry. and will operate them in their own interests.

L. C. Halloran, formerly connected with the mining side at Omar, W. Va., with the Main Island Creek Co., has become connected with the Universal Coal Co.'s Cincinnati office as a salesman in the Northwest. His headquarters will be in Chicago.

The Bethlehem Coal Co., Cleveland, has been chartered with an authorized capital of $10,000 to operate coal mines. Incorporators are W. F. Maurer, T. B. Bolton, Norton McGriffin, L. M. Coolidge and E. H. Bevier.

R. N. Osborne succeeds W. W. Austin as secretary of the Borderland Coal Sales Co., of Cincinnati, and **A. S. Bitters**, for eight years with the Matthew Addy Co., has become the traffic manager and credit man for the Borderland.

The mine of the John Donald Coal Co., near Millersburg, which **has been burning for several weeks**, cannot be sealed up because of several holes burned through the surface which admits the air to the blaze underground. The mine, which was one of the largest producers in Holmes County, was set on fire by a stove used for heating purposes. Cave-ins, which have prevented the sealing of the mine, have occurred from time to time, and an attempt to flood the mine also failed.

The Penn-Ohio Coal Co., near Lisbon, is preparing to resume operation after several weeks' idleness to install modern electrical equipment. It is expected to produce 100 tons of coal a day.

PENNSYLVANIA

At the present rate of consumption, **Somerset County**, one of the leading bituminous coal counties in central Pennsylvania, **will have coal enough to last 500 years.** A statement issued on the coal reserves of Somerset County by the Pennsylvania Bureau of Mines discloses that there are 3,987,900,000 tons of unmined coal in the county. This area represents the largest reserve of high-grade low-volatile steam coal in the state. The Berwind-White Coal Co. mines are in that district. Approximately 8,000,000 tons of coal is produced annually in Somerset County, which is taken from at least eight mineable coal beds. The lower and upper Kittannings are the thickest and best beds, most of the present production being from these beds.

A conference was recently held at Harrisburg by Attorney General George W. Woodruff, Dr. Ellen C. Potter, Secretary of Welfare, and T. Henry Walnut, chairman of the State Workmen's Compensation Board, **to consider a change in the ruling of the Workmen's Compensation Board** made some months ago. This was that the maximum which any hospital may receive for medical, surgical or hospital treatment of an injured workman shall not exceed $100. Dr. Potter contended that the ruling was most unfair to the hospitals as frequently the value of the services rendered for an injured worker is in excess of the maximum amount allowed. Full service is rendered, she said, but full payment cannot be collected.

Thomas Kennedy, president of District No. 7, United Mine Workers, in an address before the City Club, at Philadelphia, on Nov. 9 defended the coal miners' position and said that with reasonable profits for the coal operators, fair and equitable freight rates, elimination of unnecessary middlemen and a reasonable profit for the retailer, **the price of coal could be reduced at least $3.50 per ton.** In his address and in meeting a fire of questions afterward, the speaker sturdily held to it that the miners' wages are only fair and reasonable, and not responsible for high prices. He lauded Governor Pinchot. "The governor and his advisers," he said, "in one week found out more about the operators and more facts about the coal situation than the Coal Commission found out in a whole year, with the expenditure of something like $760,000.

Announcement has been made of the organization of a **company which has taken a 99-year lease on a 371-acre coal tract near Pottsville**, where bore-hole drillings are said to have shown coal of an excellent quality. The new concern is to be known as the Jordan Coal Co. with P. R. Jordan, of Scranton, as president. Plans of the stockholders call for the construction of a $200,000 breaker on the tract, while work has already been undertaken on the building of a road leading up the mountain side. The breaker construction will be started in the Spring. Officers of the company, in addition to Mr. Jordan, are: William Mack, vice-president; William Willis, treasurer; James T. Hanlon, secretary, and Albert Zenke, assistant treasurer. James J. Wilson, Joseph F. Moran and Richard Philbin are also among Scranton men interested in the project.

The Union Trust Co., of Pittsburgh, trustees of the **Consolidated Connellsville Coke Co.** first-mortgage 15-year 6-per cent sinking-fund coupon gold bonds, dated Dec. 1, 1910, has announced that at the request of the company it will pay and **redeem on Dec. 1 all of the outstanding bonds**, numbering 197, at par and accrued interest to that date, together with a premium of 5 per cent. Interest on the bonds will cease Dec. 1.

As a result of the ending of an agreement with B. Nicoll & Co., Inc., as sales agents **the Pittsburgh Terminal Coal Co. will market its own product.** The agreement, which had existed for many years, was terminated by mutual consent on Oct. 31. H. K. Stauffer, vice-president in charge of sales and formerly vice-president of B. Nicoll & Co., will look after sales for the Pittsburgh Terminal Coal Co. with offices at Pittsburgh.

The Fairbanks coke plant, consisting of 230 acres of land from which much of the coal has been removed, 200 ovens, 40 houses and plant equipment, has been **sold** by the receivers of the American Coke Corporation **to George Santos, Jr.**, of Uniontown. The consideration was $90,000. The plant, located at Fairbanks, in the Lower Connellsville district, was originally built and operated by the Struthers Furnace Co. It was taken over by the American Coke Corporation in 1920.

The tipple and boiler house of the Corrado Coal Co. at Fort Hill, which were only recently purchased, **were destroyed by fire** Nov. 5. It is believed the blaze had its origin in a spark from a passing locomotive.

Mayor Durkan, of Scranton, held a conference Nov. 1 with James B. Smith and J. Rossa McCormick, of the city's mine-cave bureau; A. W. Long, H. L. Harding and E. F. Blewitt, mining engineers, and **discussed the advisability of increasing the valuation of coal lands in the city from $320 to $581 per foot-acre for taxation purposes** during 1924. It is understood that the city officials are figuring on an average value of approximately 41c. per ton on coal in place, with the number of tons per foot acre placed at 1,400.

Philip Maue, for the last 15 years a mining engineer, has been appointed superintendent of Mt. Lookout colliery of the Temple Coal Co. at Exeter Borough. Since the retirement of Bruce Weir, in February last, the colliery has been without a superintendent. Mr. Maue will move from Shamokin to Wyoming. For the last four years he has been mining engineer for the Susquehanna Collieries Co.

W. H. Brights, of Elmira, N. Y.; **M. H. Reap** and **Joseph A. Murphy**, of Scranton, have obtained a lease on a coal dump at the Manville colliery of the Hudson Coal Co., near Carbondale. They also leased the Manville breaker and washery. It is estimated that there are over 90,000 tons of marketable coal in the dump and the new owners are organizing a company **to market the product which they will obtain after washing the culm pile.**

UTAH

Speaking at the Harvard Club, New York City, to the New York Section of the American Institute of Mining and Metallurgical Engineers, Nov. 7, J. V. W. Reynders said that **byproduct coke ovens and blast furnaces soon would be operated at Provo**, using coal from Carbon County, about 100 miles away, and iron ore from a point in Iron County about 200 miles distant, the point chosen for the furnace being favored because of the water available and the existing railroad routes. The blast furnaces will be ready in the spring. At present the pig iron will be shipped to the coast for further treatment. The aggregate assembly cost of material at Provo will be less than that to be met in the Pittsburgh or Chicago district.

WASHINGTON, D. C.

In compliance with a request from the Department of Commerce, the **National Retail Coal Merchants' Association has designated its members of the committee which is to act in an advisory capacity on coal matters**, as follows: S. B. Crowell, of the George B. Newton Coal Co., Philadelphia; M. E. Keig, of the Consumers' Coal Co., of Chicago and Roderick Stephens, of the Stephens Fuel Co., New York.

The Navy Department has awarded contracts for 25,000 tons of steaming coal for delivery into storage at the Naval Fuel Depot, Sewalls Point, Va., based upon the bids submitted on Nov. 1, as follows: W. H. Brown Coal Co., Inc., Norfolk, Va., 5,000 tons at $4.42 per ton; Eastern Coal & Export Corp., Richmond, Va., 10,000 tons at $4.75 per ton; and Fayette Smokeless Fuel Co., Mt. Hope, W. Va., 10,000 tons at $4.87 per ton.

Bids will be received by the Bureau of Supplies and Accounts of the Navy Department, Washington, until noon, Nov. 21 **for the transportation of coal from Hampton Roads by vessel to Portsmouth (N. H.) Navy Yard**, Puget Sound Navy Yard and Pearl Harbor Naval Station. From 3,500 to 5,000 tons are to be carried to Portsmouth between Dec. 1, 1923, and Jan. 15, 1924; 6,500 to 8,000 tons to Puget Sound between Jan. 1 and May 15, 1924, and 6,500 to 9,000 tons to Pearl Harbor.

WEST VIRGINIA

Colonel C. W. Watson, of New York, president of the Consolidation Coal Co., headed a party of officials of that company who inspected the mines of the concern in Kentucky during the early part of November. Others in the party in addition to Colonel Watson were Sprigg D. Camden, vice president of the company; A. Brooks Fleming, assistant to the president; Dr. F. H. Birmingham; Miss Lucy Watson, a sister of Colonel Watson, and Graham Turnbull, private secretary to Colonel Watson.

According to estimates made by A. O. Wilson, statistican of the Kanawha Coal Operators' Association, **there will be more coal produced in West Virginia during the present calendar year than during any previous year in the history of the industry in the state.** Mr. Wilson estimates that the total production of the state will reach not less than 90,000,000 tons, or about one-fifth the total tonnage for the United States as a whole. Such a production will be reached notwithstanding the fact that in recent months there has been an extremely poor market for coal in West Virginia. The Chesapeake & Ohio loaded more coal during October than during any previous month in the history of the road. It is estimated that total loadings reached 78,000 cars, or about 3,900,000 tons.

The Westmoreland Coal Co., operating in the Irwin Basin of Westmoreland County, Pennsylvania, **has taken title to the Laurel Coal Land Co.'s property** of 5,518 acres on the waters of Spruce Fork and Little Coal River in Boone County, lately owned by the Chilton family, of Charleston. The consideration was in excess of $600,000.

Five grievances in dispute between miners and operators were **settled** at a recent meeting of the joint board of the Northern West Virginia Operators Association and representatives of the United Mine Workers of America, held in Morgantown. All the cases involving disputes within the territory of the Northern West Virginia association are understood to have been settled without much difficulty.

Announcement has been made of the appointment of **John Stewart as general mine manager of all the J. S. Sullivan mines** in southern West Virginia. Mr. Stewart has had charge for some time of the J. C. Sullivan mines on the Norfolk & Western. His headquarters will be at Tralee, a central point for the mines which are located in Raleigh, Wyoming and McDowell Counties.

The large wooden tipple at the No. 1 mine of the Tidewater Coal & Coke Co., at Vivian, owned by the Houston interests, **is a total loss as the result of a fire**, the origin of which has not been established. The tipple was not being operated at the time of the fire, which started about an hour before the day's work began. It is thought that the wooden structure will be replaced with a modern steel tipple.

Plans are being laid by the West Virginia Department of Mines, co-operating with the West Virginia University, **to increase the enrollment of students in the night school mining classes** held throughout the coal fields to 1,200, R. M. Lambie, chief of the department, has announced. The enrollment now is between 800 and 900.

The Raleigh Coal & Coke Co., which is establishing a modern mining community at Raleigh Heights, in the Winding Gulf field between Raleigh and Sylvia, **has awarded the contract for twelve dwelling houses**, which will be built of red tile. It is planned to build 250 modern dwellings in all for miners.

The Gibraltar Coal Co. has just been launched by Charleston capitalists with a

For Better Boiler Practice in Use of Anthracite read pages 767-772

view to operating in the Kanawha field. The company has a capital stock of $100,000, and its principal office is to be at 110 Hole Street, Charleston. Having an active part in organizing this company were H. Steen, H. W. Bowers, I. F. Somerville, E. F. Huddleston and F. H. Withrow.

The Roberts & Schaefer Co. is erecting a steel tipple equipped with late model screens and loading booms at the Nellis mine of the **American Rolling Mill Co.**

CANADA

Canadian mines during August produced 1,585,000 net tons of coal, an increase of 60 per cent over the previous month and 27 per cent over the average for the same month of the three preceding years, according to the Dominion Bureau of Statistics. The output for the month showed increases of 489,000 tons in Nova Scotia, 98,000 tons in Alberta, 3,000 tons in British Columbia and 1,000 tons in Saskatchewan. The cumulative output from all mines for the eight months of 1923 amounted to 11,376,000 tons, an increase of 22 per cent over the preceding three-year average for the same period. Imports of coal during August totaled 2,746,000 tons, as compared with 2,445,000 tons in July. During August 36,900 tons of coal came from Great Britain. Importations of coal for the first eight months of the year amounted to 15,393,000 tons, an increase of 55 per cent over the preceding three-year average for the same period. Imports of anthracite in August amounted to 488,300 tons, which was 2 per cent less than in July and 40 per cent higher than the three-year average for the month. Of this tonnage, 468,700 tons came from the United States and 19,600 tons from Great Britain. The total amount of anthracite imported during the eight months ended Sept. 30 was 3,675,000 tons. Coal exported during August was 103,500 tons, as compared with 73,300 tons in the previous month. The cumulative exports for the eight months to date totaled 1,191,500 tons, or 17 per cent less than the three-year average for the same period. The tonnage of coal available for consumption in Canada during August was 4,227,000 tons, or 20 per cent more than in July, when 3,510,000 tons was made available. The total number of men employed in the coal mines of Canada during August was 28,670, of whom 21,516 worked underground and 7,154 on surface. The monthly production per man was fifty-five tons for August, as against thirty-six tons per man for July.

The collapse of the Home Bank of Canada hit the mining settlements in the Crow's Nest coal field, eastern British Columbia, pretty hard. The miners of Coal Creek are said to have suffered to the extend of $200 per head on an average. The Crows Nest Pass Coal Co. used to keep its account in the Home Bank, but at the last general meeting of the company one of the directors of the Canadian Bank of Commerce became a director of the coal company, and the account shifted to that bank.

Silby Barrett, provisional president of District 26, United Mine Workers of America, **has gone to Indianapolis to confer with John L. Lewis,** International president, regarding a new wage contract for the miners of that district. While no announcement has been made when the conferences of the officials of the union and the Dominion Coal Co. with regard to wages will begin it is expected they will start soon after Mr. Barrett's return to Sydney.

Fowndation Fuels Ltd., of Toronto, has been incorporated to deal in coal and other fuels with an authorized capital of $20,000. The provisional directors include Frank X. Burrows, Hollis E. Beckett, and William N. Robertson.

Obituary

Reuben J. Humphries, 66 years old, coal operator and well-known resident of Scottdale, Pa., died on Nov. 3. He had been in poor health for the past several years. Mr. Humphries resided in Scottdale for a number of years. He operated a coal mine near Uniontown.

Jacob Rapp, one of the oldest coal dealers in Columbus, who retired from the active head of the J. Rapp Co. about 10 years ago, died at Columbus, Ohio, last week, at the age of 81 years. He had been in the coal business more than a half century.

Trade Literature

Tachometers. The Bristol Co., Waterbury, Conn. Bulletin No. 317. Pp. 31; 8x10 in.; illustrated. Describes recording and indicating models, both pneumatic and electric. Charts and list prices are included.

Cottrell Vibrating Screen. Southwestern Engineering Co., Los Angeles, Calif. Bulletin SC-1. Pp. 5; 7x10 in.; illustrated. Describes Cottrell screens, types A and B, the former being designed for either coarse or fine screening, both wet and dry, and the latter particularly adapted for coarse screening.

The Leahy No-Blind Screen. The Deister Concentrator Co., Fort Wayne, Ind. Bulletin No. 10. Four-page folder illustrating and describing the features, uses, operations and specifications of the Leahy No-Blind screen, suitable for screening either wet or dry materials from 2-in. opening to minus 80 mesh.

New Model Multiple Retort Underfeed Stoker. Westinghouse Electric & Mfg. Co., Stoker Dept., South Philadelphia, Pa. Catalog 1678. Pp. 14; 8x11 in.; illustrated. The distinguishing features of this stoker are its fuel-feeding mechanism, fuel burning and refuse disposal parts.

Erie Electrical Equipment Co., Inc., Johnstown, Pa., has issued a 53-page catalog on **Fittings.** The book is well illustrated and covers all types of fittings.

W. A. Jones Foundry & Machine Co., Chicago, Ill., has issued the following catalogs: No. 27, on **Pulleys,** covers cast-iron pulleys, ball-bearing loose pulleys and ring-oiling loose pulleys; also steel, wood and paper pulleys. No. L-28 contains data on **Friction Clutches.**

Seven Wonders of Wrought Pipe. National Tube Co., Pittsburgh, Pa. This booklet, 3½x6 in., tells of instances where National pipe has come through accidents unscathed.

Publications Received

Engineering Features of the Moffat Tunnel; address by D. W. Brunton, chairman of the Board of Consulting Engineers to the Moffat Tunnel Commission, consulting mining engineer and former president, American Mining Congress. Delivered at a dinner of Colorado Scientific Society, Oct. 6, 1920. Describes topography and advantages of tunnel in shortening route from Denver to Salt Lake City, geologic considerations, method of construction of one railroad and of one water or pioneer tunnel, at proposed cost of $5,250,000, also ventilation and sociologic provisions. 17 pp., 6¼ x 9¼ in., 3 ill., paper covers. Publishers, Colorado Scientific Society, Denver, Colo.

The Pennsylvania Department of Forests and Waters has announced the completion of a bulletin on **"Volatile Matter in Pennsylvania Coals."** It has been prepared by James D. Sisler, of the State Topographic and Geologic Survey. The bulletin contains a map showing the percentage of volatile matters of coals in the bituminous and anthracite fields. The discussions in the bulletin are based upon analyses of coal from 700 mines in Pennsylvania, made by the U. S. Bureau of Mines in co-operation with the State Geologic Survey. The bulletin presents for the first time the location of lines of equal volatile matter in Pennsylvania coals and shows graphically the relation of folding, faulting and movement to the chemical character of coals. It also shows the relation of oil and gas pools to volatile matter in Pennsylvania coals and points out the fact that great caution must be used in drilling in areas known to be much altered by folding and faulting.

Design of Concrete Structures, by L. C. Urquhart. Pp. 450; 6x9 in.; illustrated. Price, $4. A textbook on concrete and reinforced concrete design. McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

Electrical Machinery Apparatus and Supplies. Census of Manufacturers, 1921. Bureau of the Census, Washington, D. C. Pp. 19; 6x9 in.; tables. This report is one of the series presenting the results of the first biennial census of manufactures, which covered the operations of manufacturing concerns during 1921.

The Merchants' Association of New York has issued its **1923 Year Book,** comprising 394 pages. It contains alphabetical and classified lists of its members, index, plan of organization and reprint of its bylaws.

The Destruction and the Reconstruction of the Mines of Lens by E. C. Cuvelette, general manager of the Len mines; 9 x 11½ in., pp. 20, paper cover; translation of "La Destruction et La Reconstitution des Mines de Lens"; Publisher, L. Danel, Lille, France.

Traffic News

Questions involved in fourth section applications in connection with **rates on coal from points in Ohio to points on the Grand Trunk Ry. will be considered** at an Interstate Commerce Commission hearing in Columbus, Dec. 10. Examiner Disque will preside. On the same date a hearing will be conducted in Cleveland by Examiner Satterfield in the case of the **Cleveland & Western Coal Co. vs. the Director General of Railroads.**

Rates applicable on coke, in carloads, from Indianapolis to Marshalltown, Iowa, are not unreasonable, the Interstate Commerce Commission has found in the case brought by Tuffli Brothers Pig Iron & Coke Co. In similar fashion the Commission upheld the rates on coke from Indianapolis to Omaha. In that case the rates have been attacked by the Citizens Gas Co.

Decision by the Interstate Commerce Commission relative to leasing of the Carolina, Clinchfield & Ohio R.R. to the Louisville & Nashville R.R. and Atlantic Coast Line R.R. is expected soon after Nov. 20, according to Edward S. Joucett, vice-president and general counsel of the Louisville & Nashville R.R.

The Louisville & Nashville R.R., recently announced that **in October it handled 57,462 cars of coal, representing the largest month since May and June of 1922,** when the general mine strike in union fields resulted in a great demand on Kentucky mines which favored with big demand and free car supply, operated at near capacity.

The Rocky Mountain & Santa Fe Ry. has applied to the Interstate Commerce Commission for authority to acquire the line of the Santa Fe, Raton & Eastern R.R. for the purpose of furnishing carrier service for the Sugarite and Yankee coal mines, in the Raton field of New Mexico.

Having been notified by the Interstate Commerce Commission that the appeal of the coal operators of southeastern Kansas for reduced freight rates from the fields near Pittsburg, to Kansas City, Mo., had been reported unfavorably by the commission's examiner, operators in Pittsburg are bringing up their resources to continue the fight.

Questions involved in the following **coal traffic case will be considered at public hearing in Indianapolis,** Dec. 4, before Examiner Carter: Citizens Coal & Supply Co. vs. Big Four; Hub Coal Co. vs. Wabash R.R.; Fourth section applications from points in the Clinton, Brazil and other coal-producing districts in Indiana.

The Baltimore & Ohio R.R. has placed orders for 500 all-steel hopper cars and 500 steel underframe box cars with the Pressed Steel Car Co., McKees Rocks, Pa., and the American Car & Foundry Co., Berwick, Pa., respectively.

Coming Meetings

Harlan County Coal Operators' Association. Nov. 21, Harlan, Ky. Secretary, E. R. Clayton, Harlan, Ky.

Illinois Mining Institute. Annual meeting Nov. 24, Springfield, Ill. Secretary, Martin Bolt, Springfield, Ill.

Second National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York City, Dec. 3-8. Managers, C. F. Roth and F. W. Payne, Grand Central Palace, New York City.

Coal Mining Institute of America will hold its annual meeting Dec. 19, 20 and 21 at Pittsburgh, Pa. Secretary, H. D. Mason, Jr., Chamber of Commerce Building, Pittsburgh, Pa.

West Virginia Coal Mining Institute. Annual meeting Dec. 4 and 5, 1923, Huntington, West Va. Secretary, R. E. Sherwood, Charleston, West Va.